McGraw-Hill International

Management Digest

J. R. D. Tata: He leads the fight for private industry in India—p14

PLANNING FOR TOMORROW'S PROFITS

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all-new Dodge - De Soto - Fargo Trucks

4-WAY LEADERS OF THE TRUCKING WORLD!

Now Chrysler Corporation brings you the trucks that lead their competitors in all four major measures of value. Here they are—all-new Dodge-De Soto-Fargo trucks . . . the Power Giants for '58.

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An Allis-Chalmers Fork Lift Truck of 1800 kg (4,000 lb) capacity stacks bags loaded on pallets. This method is fast and makes possible greater utilization of storage space.

ALLIS-CHALMERS Fork Lift Trucks reduce the costs of handling heavy, bulky materials, operating efficiently in warehouses, factories, docks and terminals.

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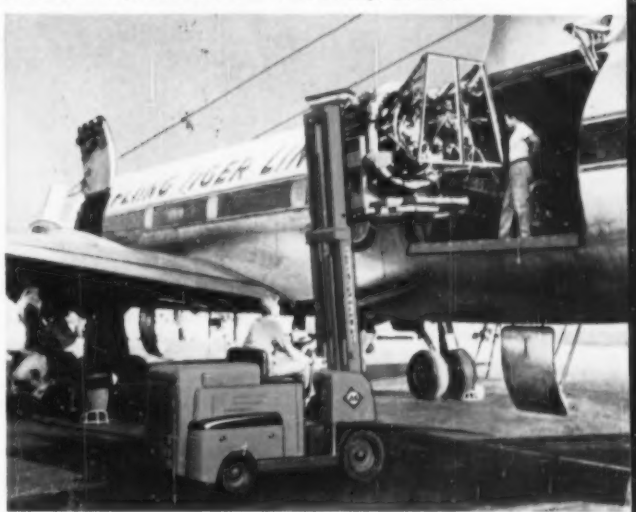
Allis-Chalmers trucks stand up to the most demanding service. Backed by over a century of experience in the manufacture of industrial equipment, these machines are saving their owners large sums of money every day.

Unloading an engine from airplane is easy for this Allis-Chalmers Model FT70 Fork Lift Truck.



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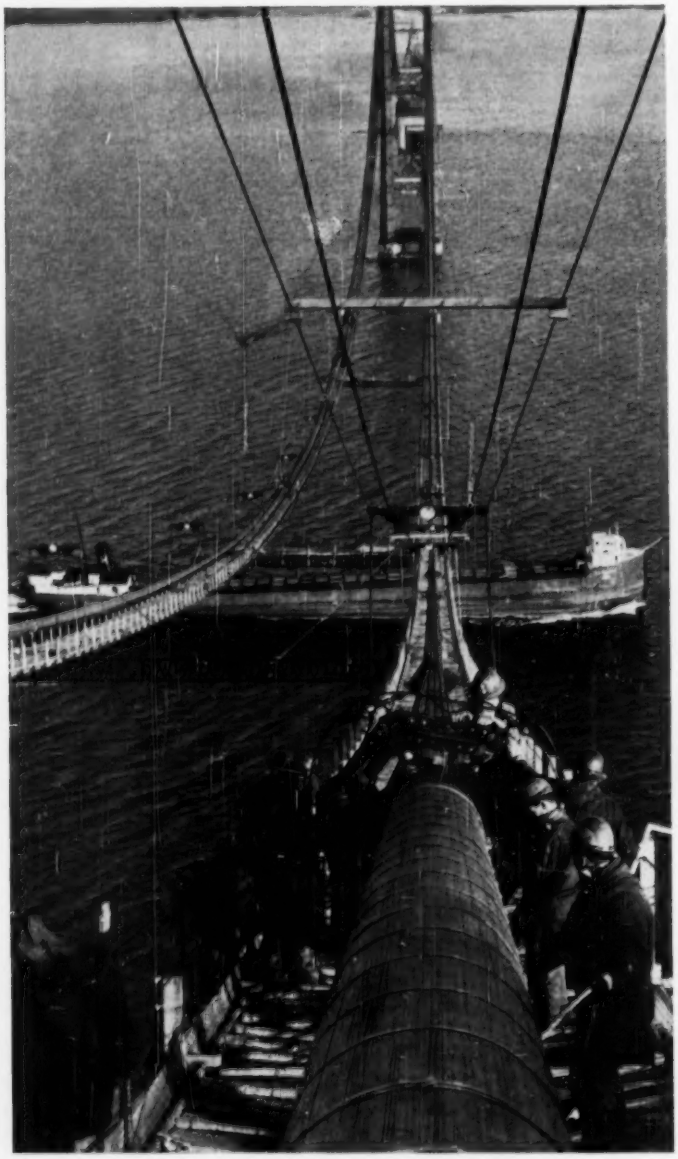
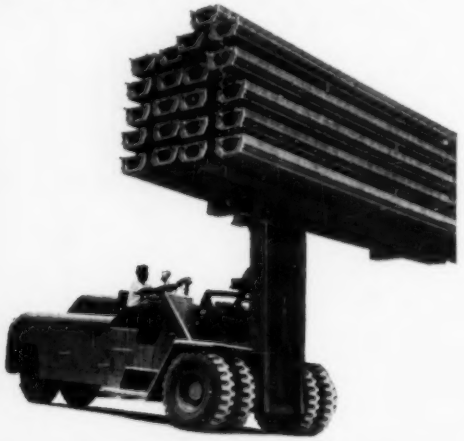


WIRE ENOUGH TO REACH NEARLY TWICE AROUND THE EARTH. This picture was taken on the world-famous Mackinac Bridge, which United States Steel is building across the 4-miles-wide straits at the entrance of Lake Michigan in the U.S.A. The main suspension cables contain 41,000 *miles* of tough 3/16-inch-diameter galvanized steel wire. Each cable is over two feet in diameter and contains 12,580 wires.

HEAVY-DUTY WORKHORSE. Here is the largest standard lift truck on pneumatic tires. The forks (which "shovel" under the load) are made from USS "T-1"* Steel – a remarkably strong constructional alloy steel that can withstand severe impact and abuse even at sub-zero temperatures. Unlike most very strong alloy steels, USS "T-1" Steel can be readily welded.



BEAUTY THAT LASTS. The much-used doorway to this research laboratory will remain bright indefinitely, because it's made of USS Stainless Steel, the lustrous metal whose beauty goes all the way through. The surface is as tough as it is beautiful, so it won't be marred like softer metals.

* Trademark

UNITED STATES STEEL EXPORT COMPANY
30 CHURCH STREET, NEW YORK 8, U. S. A.

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Management Digest.

THE BEST FROM 68 BUSINESS MAGAZINES

JANUARY 1958
VOL. 13 NO. 1

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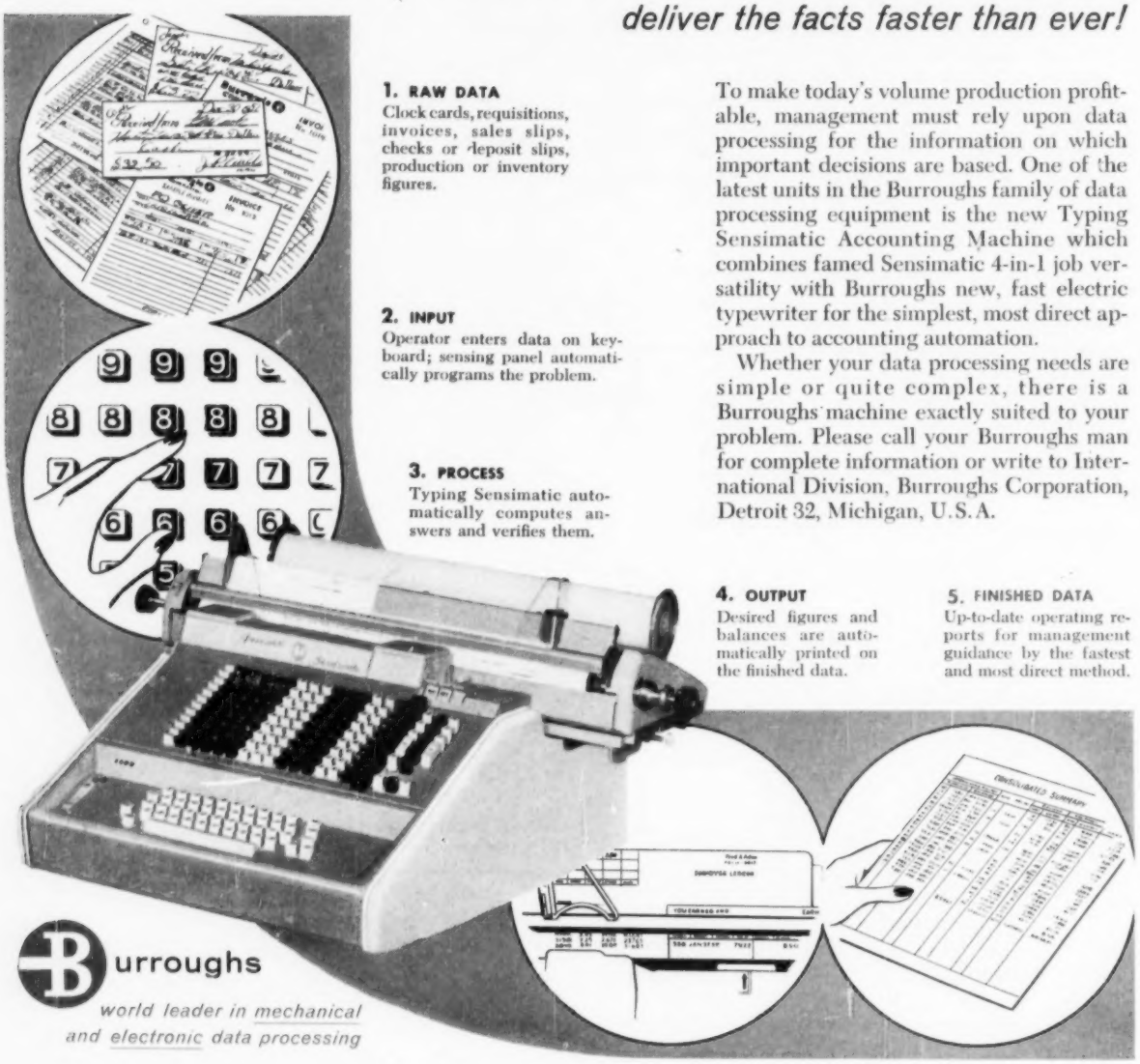

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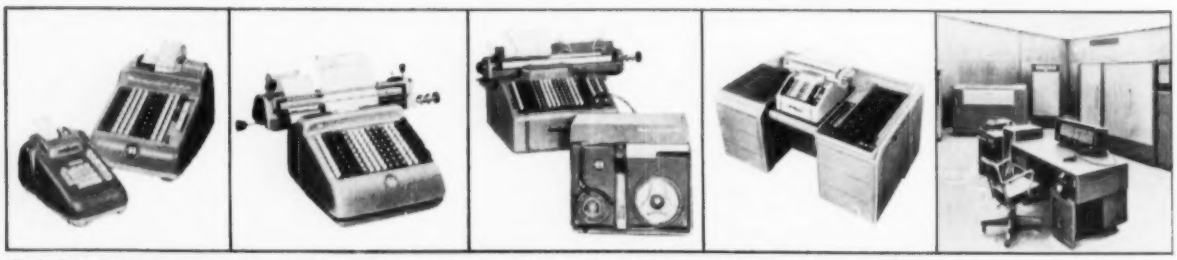

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NEW YORK CITY
JANUARY 1958

The Readers Report . . .

Satisfied Customer

Sir . . . As a very new subscriber to your publication I thought you might care to hear how impressed I have been by it. The only possible complaint I have is that there are only twelve issues in a year!

K. B. MASON
BEXLEYHEATH, ENGLAND

Comment from Norway

Sir . . . I have with interest read your October issue. Your finance article has the heading "New Approach to Capital Financing," but I cannot see that this is new. The approach must always have been the same for businessmen although they have not had the illustration from Professor Foster. I studied at the University of Cincinnati, College of Business Administration, from 1946 to 1948, and our professor in Finance, Mr. Gruen, who later went to Dartmouth, presented the problem exactly the same way Mr. Foster does it.

To raise additional capital by loans means more liabilities for the common shareholder, which in turn means more risk. If earnings are good, the shareholder will naturally get more dividend due to the higher risk.

TH. HAANES
ARNESEN & VON TANGEN
OSLO, NORWAY

Sir . . . Thank you so much for sending me the July issue of MANAGEMENT DIGEST containing the article "More Business for the Tax Havens." The information given is very interesting, particularly to businessmen here in Norway where the taxes probably rank among the highest in the world.

I have noticed that your article mentions that International Trust Co. of Liberia has a new branch in Zurich. I am interested in getting in touch with this organization, and wonder if you could get me the address of their Zurich branch.

Please let me know how much I owe you for your assistance so far.

E. D. ARNTZEN
A/S OSTLANDSKE
FINANS-SELSKAP
FREDRIKSTAD, NORWAY

● Write to Mr. Edgar T. Konsberg, Liberian Services S. A., Pelikanstrasse 37, Zurich 1, Switzerland. No charge!—EDITOR

Cheaper than Washington

Sir . . . In a recent issue of MANAGEMENT DIGEST some of the most expensive places in the world to live, measured against an index scale where Washington, D. C. stands 100, are mentioned.

We take the liberty of asking you the figure for Mexico in this scale.

TH. A. SPOOR
ROBERTSHAW-FULTON CONTROLS COMPANY
MEXICO D. F., MEXICO

● Mexico stands up as one of the less expensive capital cities—at 83.3. Tampico, by the way, is 84.8. Compare that with 167.8 for Phnom Penh, Cambodia, and 162.6 for Caracas. But remember these figures change constantly.—EDITOR

Smile from Japan

Sirs . . . Had I known my picture was to be used on the cover (December, 1957), I am sure I could have managed a big smile.

Seriously though, I should like very much to thank you and the members of your staff for doing such a splendid story on Japanese productivity. As you know, those of us connected with the Japan External Trade Recovery Organization have always stressed high quality and orderly marketing. In order for Japan to maintain her economic equilibrium, she must increase her productivity.

Thank you again. I am certain that publications such as MANAGEMENT DIGEST do a great deal toward clarifying world business issues.

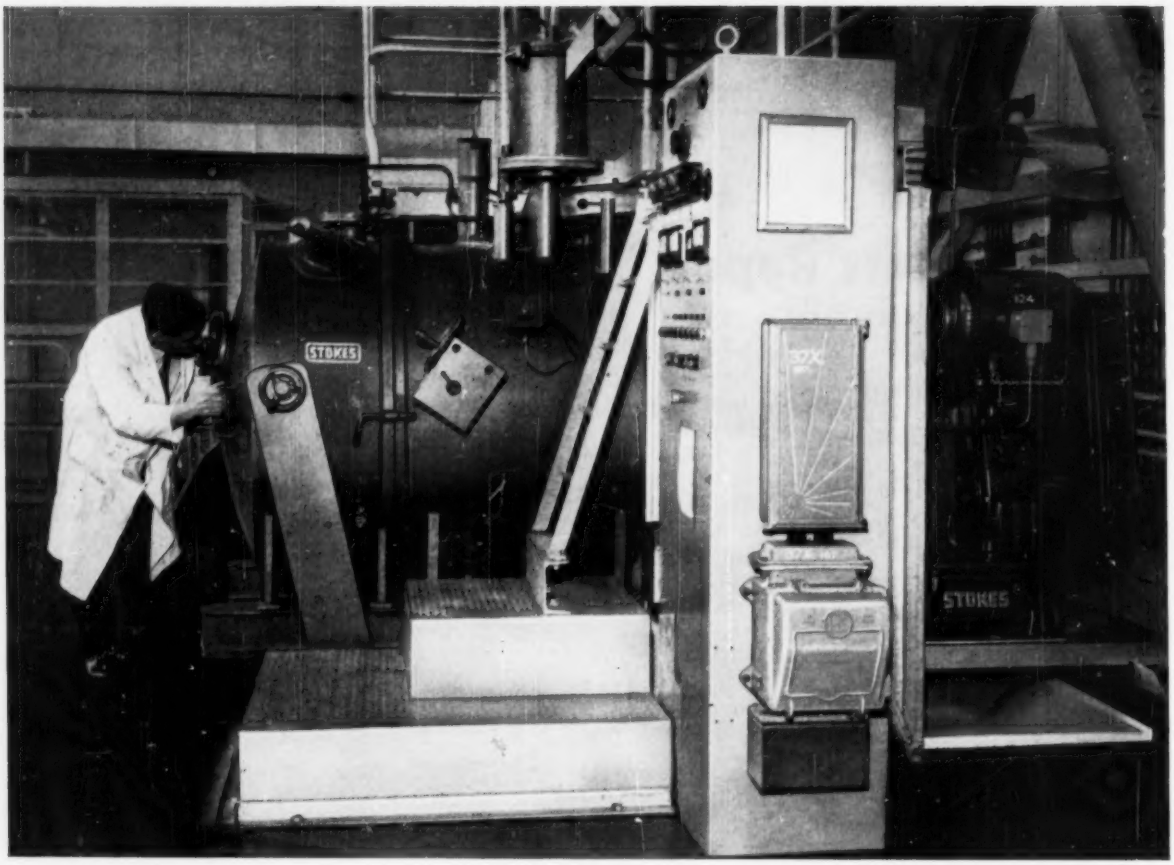
M. TANIGUCHI
Executive Director
JAPAN TRADE CENTER
NEW YORK, N. Y.

To Cure La Monga

Sir . . . On page 29 of the November issue you say "Fortunately, influenza is a mild disease." Here, we call influenza La Monga—and I got it. But I managed to cure myself with what we call an "encalistino;" that is alcohol prepared with some special herbs. I am feeling much better, Sir, and I am 78 years old. Hope that you do not get it.

JAMES JOSE PAXTOT
SAN JUAN, PUERTO RICO

● We hope so too. But we would feel more confident if we had Sr. Paxtot's formula for that wonder-working medicine.—EDITOR



"Harwell" uses Stokes Vacuum Furnace for nuclear fuels investigations

The United Kingdom's Atomic Energy Research Establishment at Harwell, Didcot, Berks., England, has had this Stokes Vacuum Furnace in successful operation since late 1956.

The furnace is used to investigate methods for simultaneously melting and pouring uranium under vacuums of 1-10 microns, at temperatures of 1200-1400° C. The work is part of an experimental investigation of pyrometallurgical processing for nuclear fuels as a possible alternative to "wet" chemical methods.

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STOKES

▶ WORLD TRENDS

TRADE IN 1958

There is little doubt that world trade will suffer a set-back this year. But look at it over the perspective of the past five years.

In first-half 1957, world exports ran at an annual rate of over $101,000-million; the total probably dropped to something under $100,000-million by year-end. But that is still extraordinarily high—the product of two and a half years of boom.

At worst, trade in 1958 should compare favorably with every postwar year except 1957 and possibly 1956 (when exports hit $93,000-million).

Much depends on the primary commodities. They account for half of world exports, and are crucial to the purchasing power of many nations.

Here is where 1958 is likely to hurt the most. The Economist, London, guesses that the annual export earnings of the primary producers are now running about $4,000-million lower than in the past two years. Such a drop is not large in the overall scheme of things, but when it falls largely on poorer nations—with limited foreign exchange reserves—exporters everywhere can expect lower sales.

Commodity weakness has stirred up demands for emergency international action to support prices. But there is little chance that the U. S. A. and Britain are ready to discuss price-propping.

Summing up, The Economist discounts fears that commodity prices will drop so far as to cause a world slump. If the slump comes, it will be because of a fall of production in the U. S. A.

There, the speculations of the past two months (MD, Dec, p11) **have been borne out by facts:** American business is in a mild recession.

At the moment the downtrend promises to be a relatively small one, shallower and shorter than 1953-1954. Most observers look for a turnaround after the middle of the year.

Meanwhile, they see no prospect of a dangerous level of unemployment, no sharp drop in production or income, no major price changes, no drastic fall-off in imports (though they will edge downward in the first half).

SHIPS IN SURPLUS

The world's shipbuilders are breaking records at an astounding rate: 1957 saw completion of 7.8-million tons; 1958 promises 9-million tons.

Yet instead of congratulating themselves, the shipbuilders are worried.

Tonnage expected this year will be far ahead of near-term demand—almost twice the usual replacement factor for the world's fleet. The problem began with over-enthusiasm on the part of shipowners and shipbuilders—now the levelling of world trade has caught up with them, and freight rates are down.

The prospects: No sign of early improvement. Orders will be few, and shipyards should expect some cancellations of ships already scheduled.

As for tankers—"Cinderellas" of the past two years—nearly two-million tons have been pulled out of service.

Turn the page for more WORLD TRENDS

PETROLEUM HAS PROBLEMS, TOO

Laid-up tankers reflect the fact that petroleum demand is down—at a time when the world's storage tanks are full to the brim. Oil consumption last year fell short of the 7½% average annual increase that the industry has enjoyed since the war. And estimates for 1958 suggest the same.

There are some strictly temporary factors at work, reports Petroleum Press Service of London. The Suez closure caused a sharp increase in demand for bunker fuels—and that has faded. Europe's largest oil consumer, Britain, is in an unexpectedly easier coal position. Also Suez encouraged economies in oil use which have persisted.

The crucial factor, of course, is the level of business in Europe and the U. S. A. A mid-1958 uptrend could end oil's problems fairly rapidly. And a cold winter would help.

Meanwhile, none of the experts are revising their long-range estimates, which predict a vast increase in petroleum demand.

WATCH THE WEST GERMANS

Keep an eye on the German business scene during the next few months. Significant changes are in the wind. Bonn's big budget surpluses may vanish. Prices are edging up. Workers demand higher wages and shorter hours. Interest rates have dropped.

New export orders for steel and capital equipment are dropping, too. German exporters will face stiffer competition from other industrial nations.

Watch Prof. Ludwig Erhard. As economic problems come to the fore, the German statesman-economist will play a larger role in Europe.

Erhard, whose liberal economic policies helped shape the "miracle" of German industrial recovery, is now the strongest figure in Bonn after Chancellor Adenauer himself.

Erhard knows the dangers to trade of Germany's huge exchange surplus. Now he is in a stronger position to try to "cure" the surplus, and put some of Germany's reserves back into circulation. Note his consistent encouragement of larger imports by Germany, and his hopes that Germany will become a major exporter of private capital in years to come.

And Erhard is one of the leading German advocates of a Free Trade Area linked to the European Common Market. His leadership could do a lot to keep Europe on the path to more liberal trade.

AN AFRICAN RUHR?

It is a possibility—in the Belgian Congo. Plans are underway that could in 30 years make the Congo the world's largest and cheapest producer of power, and Africa's most important industrial complex.

The plans hinge on the $3,000-million Inga Rapids project, just approved by the Belgian government. The hydro-power potential there is said to be twice that of the Soviet Union, and very accessible. The Belgians hope the combination of cheap power and the Congo's rich resources will prove irresistible to their own and to foreign industrialists.

THE VICE PRESIDENT

Mr. Richard Nixon's responsibilities—and his stature—have risen dramatically. Even his enemies (and there are many in both U. S. political parties) admit he has grown in his job, and in his understanding of world problems. The young American vice president has emerged as the Administration's strongest spokesman for the Western alliance, for liberal trade policies, for foreign economic aid.

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Camera time-exposure dramatizes toughness and rigidity of Fortiflex-A. Liquid filled, blown bottle is dropped onto hard surface. Close-up, taken after test, shows bottle to be undamaged and that . . .

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Philippines, Manila . . . . . F. E. Zuellig Co., Inc. . . . Chemicals & textile products.
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Spain, Barcelona . . . Extractos Curtientes y Productos Quimicos, S. A. . . . Chemicals, plastics & resins.
Sweden, Alvenas Valberg . . . . . Svenska Rayon Aktiebolaget . . . Textile products.
Sweden, Stockholm . . . A. B. Metall & Bergprodukter . . . Chemicals.
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Switzerland, Basel . . . . . Chemische Fabrik Schweizerhall A. G. . . . Chemicals, plastics, resins & C. A.
Switzerland, Zurich . . . . . Walter Aebli & Co. . . . . Textile products.
Syria, Damascus . . . . . Sahmarani Hammour & Cie . . . . Textile products.
Taiwan (Formosa), Taipei . . . Dah Chung Trading Co. . . . Chemicals, plastics, resins & textile products.
Vietnam (So.) Saigon & Laos . . . Getz Bros. & Co. (Vietnam) . . . Chemicals, plastics & resins.
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£

THE POUND STERLING—essential to the conduct of world business—gains strength. But while sterling's 1958 outlook is brighter, it will face more severe tests in years to come.

What Future for Sterling?

THE PROBLEMS OF THE POUND are, in a real sense, problems of the world. Next to the U. S. A., the United Kingdom is the "prime mover" of world business. Sterling is the accepted medium of international exchange for nations embracing a quarter of the world's population; it finances about half the world's trade and payments. Little wonder, then, that businessmen everywhere ask: "What is the future of sterling—in 1958?—in years to come?"

There are differences of opinion among the experts. Talk to them, as MANAGEMENT DIGEST did, and you find this consensus:

Short-term, the pound seems much stronger;

Long-term, there is a risk that the pound may not be able to play its preeminent role in world business. How much risk depends on whether you talk to an optimist or a pessimist.

There were significantly fewer pessimists when MANAGEMENT DIGEST went to press than there were several months before. For the time, at least, the optimists are gaining.

1. Factor of Strength

The optimists believe sterling's future as a world currency is brighter now than at any time since World War II—despite London's heavy loss of gold and dollar reserves last year. Only a major political upset in Britain, or a disastrous dip in world business, could dim the outlook.

The new factor of strength is Prime Minister Macmillan's grim determination to defend the value of the pound—even if that means mounting unemployment. His government is convinced that the alternatives would be an exhaustion of British reserves and a deep cut in imports, or a devaluation which would only postpone the crisis.

In December, Macmillan looked as if he might win the struggle to hold wage increases to increases in productivity and no more. Public opinion seemed to be swinging behind him, and even Labor Party and trade union opposition was weakening.

The determination to put the stability of the pound above everything is new. Earlier governments have given lip service to the defense of the pound, but in the end have yielded to excessive wage demands. The result has been a small but persistent inflation which creates doubt about the stability of the currency.

It is this lingering lack of confidence that has touched off ruinous "bear" raids on sterling whenever the U. K. is subjected to unusual political or economic strains. Now Macmillan's goal is to prove to the business world once and for all that it is safe, as well as convenient, to hold sterling.

He aims for a yearly surplus on Britain's current balance of payments of $1,000-million or better. That would permit Britain to maintain, even increase, its present rate of investment in the overseas Sterling Area, and still add to its reserves. This is not an unreasonable target: Britain earned some $600-million in the year ended last July—despite the Suez crisis.

II. Trader's Currency

Despite the growing importance of the dollar as a reserve and trading currency (MD, Aug'57, p13), sterling remains the most convenient medium for many nations and many traders. Holders of sterling have unequalled facilities for making payments anywhere, for short-term borrowing, for insurance, etc. More important, perhaps, the majority of world traders are used to doing business in sterling. They will continue to use it unless they become convinced that sterling's value is not being maintained.

This is why, after each "crisis of the pound," traders who have gone "short" on sterling rush to buy it again to conduct their affairs. This has happened many times—and happened most recently in late 1957 after the flight from the pound to the Deutschemark.

There is a widespread but misleading tendency to think of sterling as a "sick" currency. Yet sterling would not have remained the world currency it is if it did not have inherent strength, and if it had not been fairly well managed. Despite crises, sterling has maintained its value well since devaluation in 1949. And since 1955, when the British government announced it would support sterling in all markets, it has been convertible *de facto* if not *de jure*.

Today all that is really needed for formal convertibility is to unify "American account" sterling and "transferable" sterling. Balances in American account (the U. S. A., Canada, Central America, Bolivia, Colombia, Ecuador, Venezuela, the Philippines, Liberia) are fully convertible into dollars at

£ continues next page

the official rate; all other non-Sterling Area persons deal in transferable, which is convertible into dollars in free markets such as New York or Zurich.

Since London began supporting transferable sterling in 1955, it has become a full-fledged medium of exchange. In practice, the rates of American and transferable have remained fairly close together, except during raids on sterling such as last autumn's. But so far, transferable sterling has always managed to rally.

III. Pressure on the Pound

Firm British policies at home may reduce the frequency of flights from the pound, and could even make formal convertibility possible in a few years.

But severe pressures remain—and they come from outside the British Isles. The running-down of sterling balances by overseas sterling countries like India puts a severe strain on the pound. In most cases (and certainly India's) this does not reflect loss of confidence in the currency. New Delhi is not selling sterling to hold dollars; rather it is forced to spend sterling to finance economic development. This condition will continue as other overseas Sterling Area countries push development.

Just as any other banker, London is threatened by depositors who suddenly drain their balances. It must adjust its reserves to provide for such contingencies. But, like a bank, it can remain sound. In another way, Britain is threatened when a sterling nation restricts imports—which in turn is reflected in Britain's own trade balance. But in recent years Britain has done fairly well in other than sterling markets, and is not so exclusively dependent on trade within the "club."

Indeed, some say that as long as British goods are competitive in world markets the pound will remain strong. Right now, those goods appear more competitive in many lines, and the government's deflationary policies should make them more so.

The same reasoning can be applied to other outside influences. A severe U. S. business recession would hurt the British (and all the Sterling Area). But it would not hurt Britain more than any other country; and it would hurt Britain less if its economy is sound rather than inflated.

To some, this reasoning sounds like wishful thinking. Skeptics doubt Prime Minister Macmillan will be able to get away with his deflation policies politically; they predict enough resistance to sweep the Labor Government back into power in a year or so. That, they say, would mean inflation, and controls that would destroy progress toward convertibility.

And even if the firm policy stands, some observers are not hopeful about the longer-range outlook. They question whether the British economy is big or powerful enough relative to the free world economy as a whole to support a genuine world currency indefinitely. No matter how disciplined the British economy, it cannot generate sufficient capital to take care of the growing investment needs of the Sterling Area and still provide enough working reserves to finance the swings in such a huge share of world trade. The Sterling Area, they suggest, may become a millstone around Britain's economic neck.

You hear this view occasionally in the U. S. Treasury, where some officials are inclined to predict sterling's eventual demise. To be sure, the U. S. A. rallies round with massive assistance in a sterling crisis. But that may be because Washington is fearful of the responsibilities that would fall on the American monetary system if sterling should really collapse. And these officials question that the U. S. will always be willing or able to support sterling.

Sum it up this way: Short-run sterling looks strong and may have a new lease on life as a world currency, thanks to firm policies in London. If the U. K. can generate healthy payments surplusses on current account, it can operate as banker for the sterling system with a much smaller reserve than would be otherwise needed.

Long-run, there is a question whether the U. K. is a large enough economic unit to continue carrying the burden. But in assessing the future, do not underestimate the British economy, or the staying power of sterling. ●

In the U.S.S.R.

1. Research

If there was any doubt in the West that Russia is out to win world technological leadership, that doubt was dispelled when the first of the *sputniks* appeared in space. The evidence is mounting that the U. S. S. R. will spare nothing in its scientific quest.

From the cradle up, Russian children are indoctrinated with the glories of a scientific career; the nation's educational program is now turning out young scientists at a production-line rate. The Red scientist is the best paid, most pampered in the world—with as much as ten times the salary of a factory worker and almost as much social status as a government or military leader.

And he has perhaps greater personal freedom than any other Russian. More and more Soviet scientists are going abroad to international meetings; in contrast with their former reticence these men are becoming more aggressive about exchanging scientific data with foreign colleagues.

Dr. Edward Teller, the distinguished American physicist, and the "Father of the H-Bomb", bluntly predicts that "if the current rate of growth in Russian research continues, Russian scientists will be the best in the world within ten years."

Just what have Soviet scientists done?

As their American counterparts see it, Soviet research has been remarkably effective in some areas, rather ineffective in others. The greatest strength is in specialized areas relating to the build-up of military strength. Elsewhere, particularly in consumer products and human comfort, the U. S. S. R. lags.

Take nuclear research. Atomic physicists in Russia already have the world's largest atom smasher, and are working on a much larger one. While American experts believe they are still ahead in nuclear science, they admit the gap is closing fast.

The Soviet Union's growing stat-

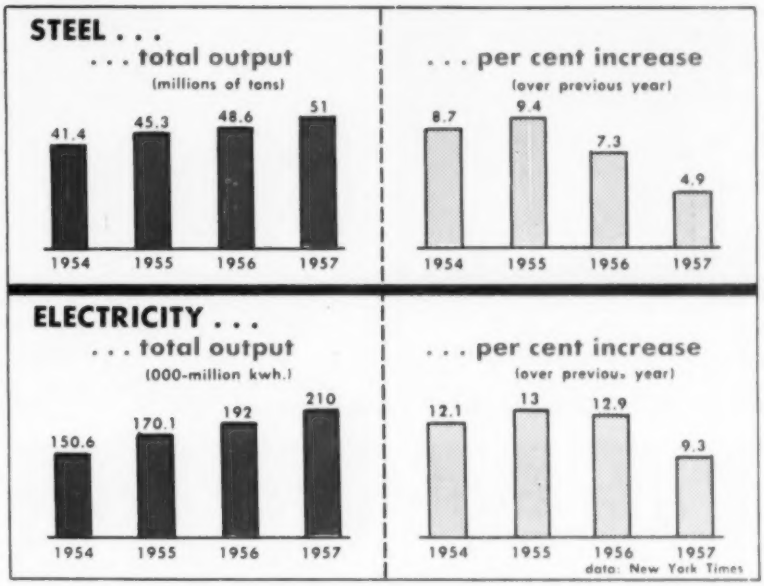
Pushes Ahead

ure in aeronautics is due to an "all-out" research and development effort—and you see the results in missiles as well as the new long-range airplanes now being produced in Russia. The fittings may be crude, and fuel consumption uneconomical, but there is no denying that the TU-104 is the world's only operational commercial jet airliner.

On the other hand, the Russians have so far not been successful in developing high-speed electronic digital computers. Their largest is not considered a match for the latest U. S. machines. As a result, you hear Soviet scientists singling out computer research as an area of "fundamental importance" to the U. S. S. R.

Most impressive, of course, have been Soviet advances in the long-range missile. In particular, their progress in electronics has astonished Western observers. At the close of World War II, the Soviets were far behind the West in almost all electronic branches. Today, they are challenging U. S. leadership. For example, they are the acknowledged leaders in radio astronomy and they have maintained their high competence in communications theory. In electronic equipment and instrumentation directly relevant to military requirements, Soviet research equals—and sometimes excels—that of Western nations. Not surprisingly, Russia stands well behind in the field of non-military and consumer electronics.

In medicine—particularly pharmaceutical research—the Russians appear to be lagging. Attempts to produce "wonder drugs" have gone poorly; researchers have apparently not been able to solve some of the basic problems involved in antibiotics, immunization, synthetic endocrines, even some of the more complex vitamins. It may be that the Soviets have been unsuccessful in their efforts. Or perhaps they do not choose to spend much time and money on such research.



2. The Economy Slows

The Soviet economy is not soaring so fast and so high as the *sputniks*. Indeed, one of the chief propaganda "dividends" of the space satellites is that they distracted world attention from the troubles of the earth-bound Soviet economy.

Those troubles are "on the record" in Moscow. The chart above presents one aspect of the general situation: Industrial output rose more slowly in 1957 than at any time in five years; in percentage terms, the increase was smallest in a decade. The problem is severe enough to have caused abandonment of the U. S. S. R.'s Sixth Five Year Plan—announced with such fanfare just two years ago.

There are other signs of difficulty. Last year's grain harvest was below 1956; housing and other consumer programs are behind schedule. The drive to raise productivity is lagging—so much so that the Soviet press is full of exhortation, and talk of new combinations of persuasion, compulsion, and incentives that will extract more output from the workers.

There is constant talk of the "production race" with the U. S. A. Communist party boss Khrushchev said in November that by 1972 the U. S. S. R. would be ahead of current (1957) U. S. production. Now, in the opinion of a *New York Times* Soviet specialist, the 1972 goals may be as impossible of achievement as the Five Year Plan targets for 1960. Such goals would demand a much faster rate of production growth than in 1957, and an immense amount of investment.

The prime questions are (1) whether the U. S. S. R. will continue to spend so much on the military—spending which may have forced the cut-back in industrial investment; and (2) whether Moscow can continue to restrict the people's consumption so rigorously. The outlook is that the U. S. A. will force Russia to keep up its heavy arms spending, and that the Soviet people will keep up their pressure for better living standards. To extract himself from this dilemma, Khrushchev will have to keep an even tighter rein on the political and economic life of the U. S. S. R.

It would be foolish to say that Soviet economic growth will not continue—and at a strong rate. Whether the U. S. S. R. can catch up to the U. S. A. is something else again. That is why Moscow's economic problems may be even more important in any balanced consideration of the U. S. A.-U. S. S. R. competition than what the Soviets do next in outer space. ●

Digested from Business Week, Nov 9, p28, 167; Nov 23, p171. New York Times, Nov 17, pE5.

In 1868, J. N. Tata (above) dreamed of modern industry for India; today the huge steel mill at Jamshedpur (right) is a pillar of Indian industry, and the pride of the Tatas.

Tata Fights for Private Enterprise

Digested from BUSINESS WEEK, Nov 23, p128

JAMSETJEE NUSSERWANJEE TATA (picture above), the bearded Parsi who founded India's largest industrial complex, was a dreamer of big dreams. He wanted nothing less than to make his huge nation industrial-minded. He wanted to build a pattern of private business that would be respected throughout India.

He succeeded. Today the small trading company that Tata started in 1868 is one of Asia's greatest corporations, stretching across the sub-continent and into every facet of business. It takes in textiles and steel, locomotives and trucks, electric power and airconditioning, oils and perfumes, chemicals and drugs, radios, tools, and a grand hotel. The book value of Tata Sons Ltd.'s investments is more than $400-million; yearly output is almost $200-million.

But Tata's importance to India far exceeds the amount of its assets. More than any other Indian company, Tata represents efficient, enlightened private industry. And in 1958, private industry — and Tata itself — face their greatest challenge.

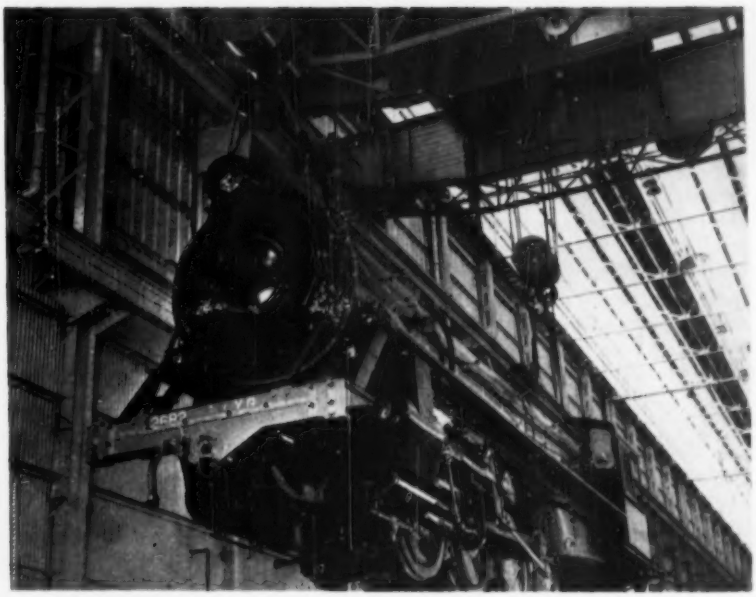
No one is more aware of this than 53-year-old Jehangir Rattan Dadabhai Tata, chairman of Tata (cover picture). Known throughout India as "J. R. D.," Tata is an energetic and sophisticated industrialist. He agrees with those Indians who believe in mixing social-mindedness with business: Tata's 115,000 employees are among the best paid and housed in India; an overwhelming share of the profits is returned to the nation in the form of scholarships, relief, hospitals. And J. R. D. agrees with Mr. Nehru when the Indian Prime Minister says that Marxism is as outdated a philosophy as 19th Century capitalism.

But while Nehru and many of the ruling Congress party leaders seem to agree with the Tata philosophy in theory, their actions do not always show it. In the past five years, India has nationalized the Tata airline, and a Tata-managed insurance company. And now there is a clamor for expropriation of Tata Locomotive & Engineering Co.—much of it coming from the Prime Minister's son-in-law, a Congress party M. P.

That is why Tata today faces an entirely new problem: How to keep up with the race to "socialize" India, yet not write the end of the Tata success story. With capital scarce, taxes high, imports slashed, dividends restricted, how can private industry fulfill its targets under the Second Five Year Plan? And if it fails to achieve the targets, will this not help the advocates of state control—who argue that private businessmen cannot do the job?

If anyone can do the job, Indian businessmen agree, Tatas can. The company fought British monopoly, India's lack of skills and capital, to pioneer industry (when Tata decided to make steel, a high Brit-

in India



LOCOMOTIVES are produced by Tata Locomotive & Engineering Co., second largest unit in Tata empire. Some government officials want to nationalize it.

TRUCK and bus production began three years ago at Tata Locomotive in association with Germany's Daimler-Benz.

POWER to meet industrialized Bombay's growing needs comes from new 125,000 kw Tata thermal plant.

ish official of the time said he would eat every pound of steel the Indians could produce). The House of Tata grew to identify itself with the struggle for independence. As the freedom movement spread, so did Tata. For to buy Tata was to buy Indian.

At the time of independence in 1947, Tata was headed by the young nationalist—but Western-oriented—J. R. D., popular with the people and with the nation's leaders. He saw a new era for Indian business, and set up the airline, began truck and locomotive manufacture, built power plants, probed growing consumer markets with Made-in-India products. But the pride of Tata remained the $56.7-million Tata Iron & Steel Co.

Here Tata first ran up against the "competition" of the government, which soon realized that steel was the pillar of rapid industrialization. Yet Tata was able to win its claim for expansion in the face of the government's plans for three state-owned mills. Finally, New Delhi agreed to guarantee a $75-million loan from the World Bank, and J. R D. has just raised another $32.5-million, half from the World Bank, half from private U. S. banks. If all goes well, the Jamshedpur steel mill will double its output to 2-million tons a year by 1960.

"If all goes well" is the question. You see what Tata is up against in a recent statement of J. R. D. Tata. He said that the new annual taxes on wealth and spending force individuals in higher brackets to pay "substantially more than 100% of their incomes. . . . In addition to the whole of their incomes being taken away, they will be made to pay something for the right to live and work in this country." What makes Tata angry is the fact that the tax applies equally to corporations founded on the money of small stockholders.

Such policies make it difficult to raise capital at home; and they frighten off foreign funds. Tata is one of the very few Indian firms able to raise money overseas.

After some hard times with the Five Year Plan in 1957, the Indian government this year seems prepared to admit that all India's ills cannot be cured by high taxes, nationalization, further state enterprise. Foreign capital seems to be receiving more encouragement. But the future is unpredictable—and it partly depends on factors behind the control of private companies like Tata. Primarily, it is a question of India's ability to ride out the present economic crisis.

Men like J. R. D. Tata are doing their best to avert collapse. They are arguing on both sides—pleading with the Nehru government to give enlightened private capitalism a chance, and asking their foreign friends for cooperation and financial help. ●

Selling Stock in the Americas

An expert argues that Latin America must build a broader market for industrial shares.

KEITH FUNSTON (above), president of the New York Stock Exchange, is a tireless spokesman for "Peoples' Capitalism." A businessman, and one of the U. S. A.'s youngest college presidents before he came to Wall Street, 47-year-old Funston has travelled throughout the U. S. preaching the gospel that stock ownership is not just for the wealthy. Today, one in 12 American adults directly own shares in businesses; and Funston has helped pioneer schemes for even wider ownership.

Now, Funston has taken his doctrine to Latin America. In a recent speech in Caracas, he stated that Latin America must encourage broad ownership of shares. Equity financing must come, Funston insists, if the 20 Republics are to achieve the growth they are working toward.

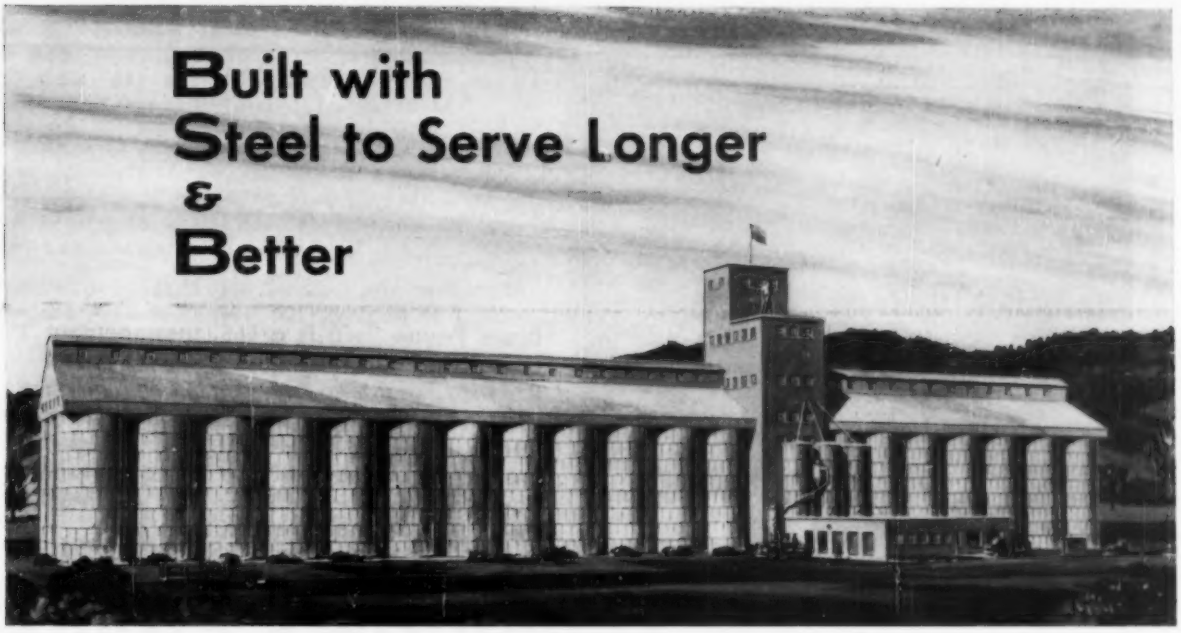
Funston estimated that output per person in Latin America would have to rise 123% by 1980, if recent growth is to be maintained. To achieve this goal, the annual rate of private investment will have to rise almost 300%—to over $30,000-million, compared to not much over $8,000-million today.

Government loans cannot do the job alone; besides, Funston believes they and other debt financing put too great a strain on an economy. And while foreign investment can help (Funston says a lot more can be attracted to Latin America), it only plays a subsidiary role.

No one—certainly not Funston—has the illusion that building a vigorous securities market is an overnight affair. Ownership of private business in Latin America is not widely dispersed; few companies have attempted to sell common stock to outsiders. Yet many companies need capital: Retained earnings have been insufficient, debt finance is fearfully expensive. Beyond that, Funston admits that social and cultural factors, as well as economic ones, may retard the growth of stock ownership.

Funston's advice: "Latin American companies, old and new, should join the securities industry in telling the public about the opportunities to share in the growth of a country." Investors should be encouraged to "understand and undertake the risks and rewards of supplying venture capital."

In time, Funston believes Latin American stock markets will come to maturity. And, in time, he hopes to see leading Latin American corporations listing their shares on the New York Stock Exchange, where they will be much closer to millions of U. S. investors. While a growing number of European corporations appear on Wall Street's "Big Board," Funston pointed out that today it does not include the stock of a single South American company. ●



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Bruce Payne (left) is a U.S. management consultant with broad experience in Latin America, and two brand new European offices. He is also a great believer in Long Range Planning. So Management Digest took a recording machine to consultant Payne's New York office to find out how management should go about . . .

Planning for Tomorrow's Profits

MD: Mr. Payne, we've heard you say that long-range planning is the only really new technique left to managers that can give their companies a competitive advantage. But what's so new about it? Doesn't every good manager plan for the future of his business?

PAYNE: Every top executive thinks about the future—and in many ways is constantly doing a planning job for his company. Many times, though, planning is thought of as forecasting or "thinking ahead" rather than detailed specific plans for the future.

We distinguish between long-range planning and forecasting; we also distinguish between planning one phase of the business as compared to planning for the whole of the business and making it a team effort. Often the long-range plans in a top executive's mind are not organized and not put into black-and-white on a piece of paper. Every phase of a business should be planned—for a minimum period of five years.

MD: We've seen a lot of five-year plans of governments in the past decade. Sometimes, quite often in fact, they become too rigid and there is trouble when they have to be revised. Isn't there a danger that the long-range planning which you speak of encourages inflexibility and rigidity on the part of management?

PAYNE: Well, there is certainly a danger that a plan will be rigid or be used in a restricted, inflexible manner. However, the one strength of a good long-range plan is that it recognizes the trends, the pressures upon business, and is prepared for short range fluctuations. Good long-range planning anticipates short-term troubles; but normally speaking, long-range trends and developments will always be the fundamental part of a good long-range plan. It cannot be a cold document. It is a living instrument, and should be used as such.

MD: Can managers in nations with extremely unsettled business conditions . . . severe inflation . . . sudden shortages . . . import restrictions . . . use long-range planning? It would seem to us that almost over-night any good plan could be ruined.

PAYNE: Irrespective of day-to-day problems, they must plan—by all means! There are long-range fundamental aspects to every business and to the long-term development of every country. Planning must be based on these.

MD: Could you give us an example?

PAYNE: Well, in Brazil, for instance, we know that the population will be at least 125-million by the year 2000. We know that every year there are more and more consumers in Brazil. So, a well-managed enterprise must constantly be planning to meet the demand from additional consumers. If Brazilian companies do not meet these demands, other companies will naturally come in and take some of that market.

And that is happening today in many countries—many companies are losing their competitive positions by not meeting the demands placed upon them. This is a most serious situation for companies in dynamic countries like Brazil.

MD: Your firm has done a lot of consulting work in Latin America. Granted that managers there could use this concept of long-range planning, do you find that they are actually trying to attack their problems in this way?

PAYNE: Up to this point there are very few companies in Latin America or in Europe which are doing long-range planning. To tell the truth, few companies in the United States are doing modern

planning. However, there is a beginning. Some of the most progressive companies are doing long-range planning and are growing stronger as a result. And they will force others to follow.

MD: How can you, or anyone else, Mr. Payne, convince managers of the "old school," accustomed to their traditional operating methods—often on a month-to-month basis—that they should get involved in long-range planning?

PAYNE: It is impossible for us or any outsider to convince some managers that planning is important to them. It is only when his company gets into difficulty financially, or when some competitor starts to take over important markets, that an "old fashioned" manager becomes interested in the competitive tool of long-range planning. Even then it may be impossible for him to understand, and it is often by his having confidence in experienced counsel that he will turn to long-range planning. Incidentally we like to call planning "profit insurance".

MD: What would be your first bit of advice to this manager who is interested in taking out "profit insurance" by planning?

PAYNE: The first step is for a firm to define its corporate goals. In other words, a company must determine where its business is going or should go in the future. The top executive will normally have in his own mind where his business should go, but very seldom does he actually put it down on a piece of paper and discuss it with other key executives—so that there is agreement within the organization of where the company is going.

MD: Perhaps now is a good time for you to sketch out briefly the essential steps of the long-range planning approach. After the top executive has decided that his company has got to look pretty hard at the future, and he has discussed this problem with his colleagues, what next?

PAYNE: Assuming that the company has determined its goals and trends of its business, the underlying trends of the country in which it is operating, and knows what the business must be to continue in its leadership position, then the next step is to determine—objectively—the specific strengths and weaknesses of the company in meeting those corporate goals.

In many companies there are several products or several different businesses involved—and it is important that the strength and weakness of each part of the business be recognized. A business obviously must work to get the most from its strength and to do everything to reduce its weaknesses relative to other businesses, products, and areas of competition.

MD: Could you give us some examples?

PAYNE: Surely. For instance, in good long-range planning the projected volume requirements of the business are established for five or more years ahead. New plant capacity may be required to supply this market. In appraising the ability of a

"Every phase of a business should be planned for a minimum period of five years . . ."

"Determine where your business should go . . . and your specific strengths and weaknesses."

"A long-range plan must reflect the best thinking of every key executive every day of the year."

continued on next page

"The whole key to making a plan work is to develop enthusiasm within the organization."

company to meet this market demand, management should ask itself three questions:

Do we have the selling organization needed to sell this volume of products competitively? It could be that the company will have to build one. Secondly, how can we develop finances to build plants or organizations to meet these projections? A company may have to improve its competitive position in order to earn the money needed to expand production facilities.

The third question: Do we have the organization to grow according to plan? It takes a team approach to get the answers to these questions down in black-and-white.

MD: If a company can answer those questions it should certainly know where it stands. The next step, we imagine, is to get up a time table.

PAYNE: That is correct. The next step is to put all company objectives—markets, plant facilities, financing, organization, and product development—onto a practical time table.

In other words, when do you expect to have a hardhitting sales organization to sell the product? When do you build more plant? What are your plans to hire and train the people to carry out the company's objectives? Then you have to consider alternatives should there be short-term adjustments.

MD: Who does the planning, Mr. Payne? Should a company have a "planner extraordinary" or should it have a committee of top planners? Just how, in terms of personnel, is planning organized?

PAYNE: The chief executive should be the key man—and the only man—responsible for long-range planning. Ordinarily, however, he does not have the time to develop the details of a plan. He has to delegate this duty.

Unfortunately it is a difficult problem to delegate. Say it is the finance officer in a company who gets the job. He may find it impossible to get the broad viewpoints and respect from the marketing, manufacturing, and engineering executives. That is one reason why companies sometimes call in an outsider—to get all the executives pulling and planning at a team.

MD: Mr. Payne, can this approach to long-range planning work for a small company, a really small company, as well as large firms?

PAYNE: Long-range planning works for every company; in fact, it is just as vital for a small company as a large company. As you know most large companies actually are many small companies under one ownership or management. And this is particularly true when we go outside the United States: Where the demand for each product is limited, a large company must be able to manufacture, sell, and finance a number of different products.

MD: How can you tell when a plan is a good one? Are there any handy "meter sticks" or criteria by which you can evaluate the plan?

PAYNE: The overriding measure is long-term profits—return on investment. The plan must make the most of a company's strength. It will have detailed plans to minimize its weaknesses. You can see how the management of a company with a good plan has so much more confidence in dealing with fluctuations in business that involve executive decision. It is a "state of mind".

I would always ask these six questions of a plan:

1. Has the planning team determined the key influences in the growth of the industry and evaluated the influence of each?
2. Have the strengths and weaknesses of the company been accurately evaluated?
3. Have the capacities of company functions to support the plan been projected far enough ahead?
4. Is there a practical timetable?
5. Have alternatives been considered?
6. Are there provisions for future troubles?

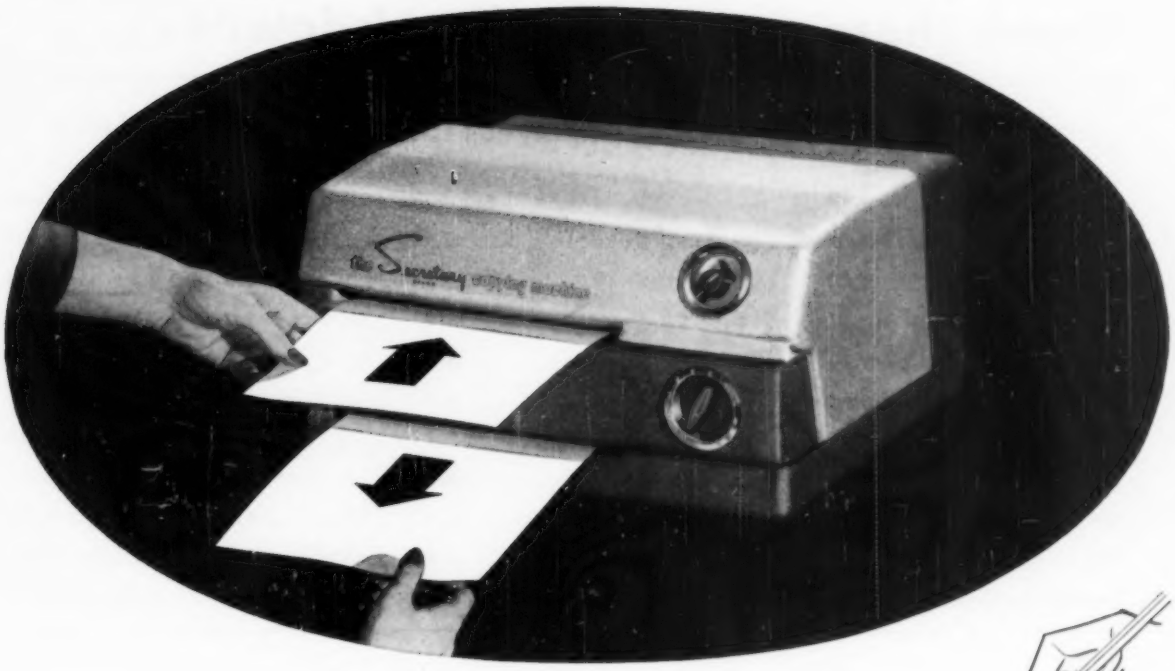
MD: Fine, Mr. Payne—our company gets all this down on paper with a good time table and all the analyses in correct order. But then how do you make the plan work?

PAYNE: I believe that the whole key to making it work is the development of enthusiasm within the organization, within the executive team of the company. The individuals must and will recognize the advantages of long-range planning to themselves. A young group of executives can see their own personal growth as well as the growth of their company over the next five or 10 years.

It is most important to develop enthusiasm for planning. And this is possible if there is confidence that the plan is based on sound fundamentals.

MD: Well, the plan is on paper, and an enthusiastic management team is at work applying it. Now can our top manager, our president, relax?

PAYNE: Never! For a long-range plan to be dynamic, it must be kept up-to-date. It must reflect the best thinking of every key executive every day of the year. And at least once a year a complete and formal reappraisal of the plan is most important to reflect new conditions, new ideas, new products that affect the future of the business. ●



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Check these manpower breakdowns . . .

1. What kind of plant operating employees (percent of total on job)

	Hourly	Supervisory	Staff Specialist	Clerical
Leather and leather products	90.8%	6.5%	0.9%	1.8%
Food products	90.5	5.8	0.8	2.9
Textiles and textile products	90.0	6.4	1.2	2.4
Lumber and wood products	89.5	6.7	0.8	2.9
Stone, clay and glass products	88.5	6.7	2.2	2.7
Paper and paper products	87.1	7.1	2.3	3.4
Primary and fabricated metals	85.9	6.8	3.6	3.7
Machinery and allied equipment	84.1	5.2	4.0	6.8
Chemicals, petroleum and rubber	82.5	8.4	4.9	4.2
Transportation equipment	78.4	6.7	5.0	9.9

How Do You Deploy Productior

Digested from FACTORY MANAGEMENT and MAINTENANCE, Sept., p109

American managers are studying a new "meterstick" for gaging their plant operating employees—those employees who work in production, maintenance, and plant-personnel administration.

The statistics above on manpower distribution in 10 U. S. industries were put together by the editors of *Factory* as a result of inquiries from their readers. Unable to locate such data, *Factory* decided to take on the job—and it was quite a job. Company officials spent anywhere from three to 24 hours completing the *Factory* questionnaire; and out of 5,000 questionnaires only 226 were reliable and complete enough to use.

What is the best distribution of manpower in your plant? Only you can decide that. But these averages can provide some useful comparisons.

If your plant is considerably above or below average in a category, it may indicate that it is overstaffed or undermanned. An excess of employees may indicate a need for mechanization, an absence of employees may mean that necessary functions (such as systems and procedures) are not being performed.

But by their nature averages must be approached with caution. Actual percentages range widely on each side of the averages. In the primary and fabricated metals grouping, for instance, an average of 13.6% of all operating employees do maintenance and plant engineering work. But the percentages ranged from 1.8% to 24.5%.

Remember the best distribution is not necessarily the same for plants of the same size in the same industry. There are differences in the degree of process integration, quantity of semi-finished and finished parts purchased, age of the plant and equipment, management's policy toward decentralization, plant location, and differences among employee groups.

Certain industry characteristics and trends do show up clearly in the survey. For instance, chemical process plants have a higher percentage of maintenance workers and a lower percentage of direct operating labor than any other industrial group. Leather and textiles have the highest ratios of production workers.

One of the most provocative comparisons comes from the figures on clerical workers.

Highest in percentage of clerical employees is transportation (including aircraft plants); lowest are leather, textile, food, lumber, and paper. Proportion of hourly workers is roughly the converse. This would seem to reflect both the nature of the product and the process.

A further breakdown of the data shows that the size of plant has a significant bearing on the percentage of employees. In plants with less than 250 plant-operating employees, an average of 3.1% do clerical work; plants with from 250 to 1,000 workers employ 3.3% clerical workers, and plants over 1,000 workers have a clerical force equal to 8.2% of its workers.

Apparently, as the staff functions grow, so does the number of clerical employees. And as maintenance grows more efficient in larger plants, the percentage of

More on Manpower

Reprints of the full 12-page Factory report digested here are available at 50¢ (U. S.) each. Write Management Digest, 330 West 42nd St., New York 36, N. Y., U. S. A.

2. What jobs they do

	Production	Maintenance	Personnel
Leather and leather products	94.6%	4.8%	0.6%
Food products	87.0	12.8	0.2
Textiles and textile products	93.9	5.4	0.7
Lumber and wood products	90.1	9.4	0.5
Stone, clay and glass products	84.3	15.2	0.5
Paper and paper products	81.0	17.2	1.8
Primary and fabricated metals	84.9	13.6	1.5
Machinery and allied equipment	91.8	7.1	1.1
Chemicals, petroleum and rubber	77.6	20.9	1.5
Transportation equipment	90.1	8.1	1.7

Manpower?

maintenance employees decreases and the percentage of clerical employees (who make the function more effective) increases.

A new survey just announced by the U. S. A.'s National Industrial Conference Board gives further meaning to *Factory's* figures. The basic structure of the labor force in U. S. industry seems to be changing. Compared to three years ago, a smaller proportion of the labor force is in direct production, maintenance, and production control—but a greater proportion fill clerical jobs.

Company officials say that improved equipment is the most important factor in this shift. Other reasons: expanding business, keener competition, development of new products, decentralization, and additional reports required by government agencies, trade associations, and plant management.

For an account of how one company reversed this trend in paperwork, see "Streamlining Plant Paperwork" on page 26.

Still, the vast majority of all production employees work directly at getting out the goods—fabricating, processing, and assembling. ●

3. Here is detailed breakdown for Machinery & Allied Equipment

What production employees do

General Administration	2.8%
Direct Production	64.8
Materials Handling (including receiving, shipping, warehousing)	6.2
All Other Indirect	7.4
Industrial and Production Engineering	4.0
Quality Control, Test, and Inspection	5.0
Production and Inventory Planning Scheduling, and Control	3.2
Budget and Cost Control (not in accounting department)	.2
Design, Construction and Repair of Tools, Dies, and Patterns	4.9
Traffic and Transportation	1.1
Other	.4

What maintenance and plant engineering workers do

General Administration	4.7
Electrical Maintenance	14.1
Mechanical Maintenance	20.1
Buildings and Structures Maintenance	26.3
Power Plant Operation	3.6
Cleaning and Sanitation	22.1
Maintenance Stores	4.5
Other	4.5

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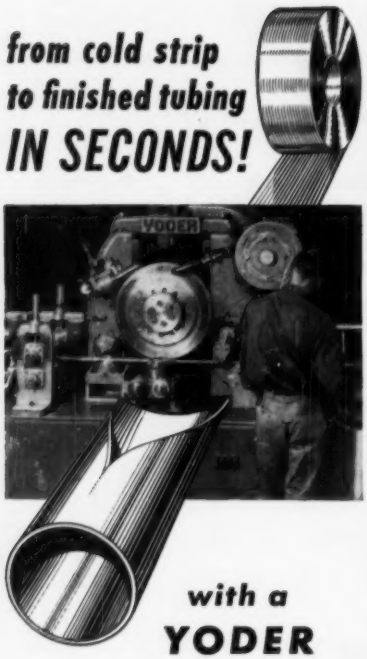

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In Management

● **A PSYCHIATRIST,** Dr. W. A. Watters (above), has been hired by an international oil company to help supervisors improve the "counseling" of workers. For many supervisors, the most perplexing questions is what to do when a worker brings up personal matters.

Watters' recommendation: "Listen to him for a while. Then tell him you know he must be worried about the things he is discussing, but that he should talk them over with someone better qualified (a doctor or minister). Be sympathetic, but get back to the problem at hand—his job performance."

"Remember," cautions Watters, "that when a man begins to tell you about his personal problems, such as home troubles, he may be anxious to unburden his soul to show you off-the-job reasons for substandard work. If you allow yourself to become involved, you are in danger of losing the man's respect—and gaining his resentment. The next day, or the next week, he is going to stop and think of all the things he has said to you. Nine times out of ten he is going to hold a grudge against you." (*Petroleum Week, Nov.*1, *p*43)

● **COMPUTER CRITERION:** A U. S. business consultant has come up with figures indicating that a company must have more than 100 clerical employees engaged in preparing reports and keeping records up-to-date to justify an electronic data processing system—if the equipment is to pay for itself from clerical savings or the displacement of punched-card equipment. However, some of the computers coming on the market show promise of cutting the figure to 30, and eventually the number may be reduced to about 10. (*Chemical Week, Nov.* 9, *p*40)

● **"AS A PRACTICAL WORKING SCHOOL** for the development of an international viewpoint and habit of thought, I know of few better places than our great international business ventures," says a U. S. economist studying the operation of world businesses.

"I am impressed," continues Emile Benoit of Columbia University, "with the extent to which nationalistic attitudes have been overcome or sidestepped. The atmosphere is ordinarily one of practical down-to-earth internationalism in which men are treated on their merits. While existing national differences are not ignored, there is a tacit assumption that men of diverse nationalities are sufficiently alike so that they can be treated more or less similarly, whether as co-workers, customers, or investors."

● **BUREAU OF BUSINESS RESEARCH** of U. S. A.'s University of Pittsburgh has concluded that bad management is the main cause for the failure of small businesses (see MD, Aug. 1957).

Commenting on the study, the *Wall Street Journal* says, "Many of these businessmen have been lured into bad management practices by the siren of prosperity. They would probably have failed earlier except that the excess of boom for a time obscured poor financial and sales planning and general administrative deficiencies."

● **FOR YOUR CALENDAR:** International Conference on "Training Within Industry," under auspices of Instituto per l'Addrestramento nell'Industria (IAI) and other management groups; Rapallo, Italy; February 3 to 8, 1958.

Second Inter-American Management Conference, White Sulphur Springs, U. S. A., November 16 to 21, 1958. Theme: "Managers for Expanding Economies." Workshops will explore practical aspects of management. Host for the conference will be The Council for International Progress in Management, under auspices of the PACCIOS organization.

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Reversing a trend to more clerical workers and fatter files, a U. S. engineering company saved $200,000 in a year, reassigned 50 workers by . . .

Streamlining Plant Paperwork

Digested from FACTORY MANAGEMENT AND MAINTENANCE, Nov p108

Perhaps more paperwork and clerical workers indicate progress and greater industrial efficiency (see page 22). But this "efficiency" can get out of hand—and managers can be buried in a mountain of paperwork.

Here is proof that management can dig out from under this mountain. A year ago the U. S. A.'s Cooper-Bessemer Corp., an engineering (engines, compressors, etc.) company with 4100 workers, set out systematically to streamline its paperwork systems—with the full cooperation and teamwork of the company president, the systems manager, and the production manager.

The results, for the first year: Cooper-Bessemer estimates it has used 1.5-million fewer pieces of paper to operate its plant. Fifty employees have been reassigned so far; and the ratio of direct to indirect labor has been reversed: For the first time since 1947, Cooper-Bessemer's labor ratio comes out with direct labor on top.

Dollar savings: an estimated $200,000.

If paperwork is a problem in your plant, the six examples below of how Cooper-Bessemer streamlined its systems—the old way, new way, and results—should be helpful. You will note all through these examples that the plant operating people let the accounting department keep the vital records, and let the staff departments function with freedom.

I. Receiving Materials

Old way: The receiving department got a copy of every purchase order, filed it pending arrival of material. When the material arrived at the plant, Receiving matched the packing slip to traffic, then made up a six-part receiving report. Copies went to departments in charge of material control, accounting, production follow-up, purchasing, stores. Receiving filed one copy with the copy of purchase order.

New Way: The purchase order doubles as a receiving report. Three copies go to Receiving instead of one. When the material arrives, Receiving checks quantities and identity. It forwards one copy of the combined form to purchasing department, another to material control. From these points the copies are routed as required. The packing slip still goes to the traffic control man.

Results: No more forms to prepare in Receiving. And one entire six-part form is replaced by two pieces of paper that are prepared at the same time the purchase order is made up. That wipes out the need for four file systems.

II. Ordering Raw Stores

Much of the company's work is custom, so there's a raw material control problem.

Old Way: The Stores Department developed inventory requirements from the material for each job. If 112 square centimeters of 1.25 cm. plate was needed for a particular job, Stores would charge it against "on hand" balance. This was adjusted daily as orders were released and stores were used.

New Way: Stores sells to the

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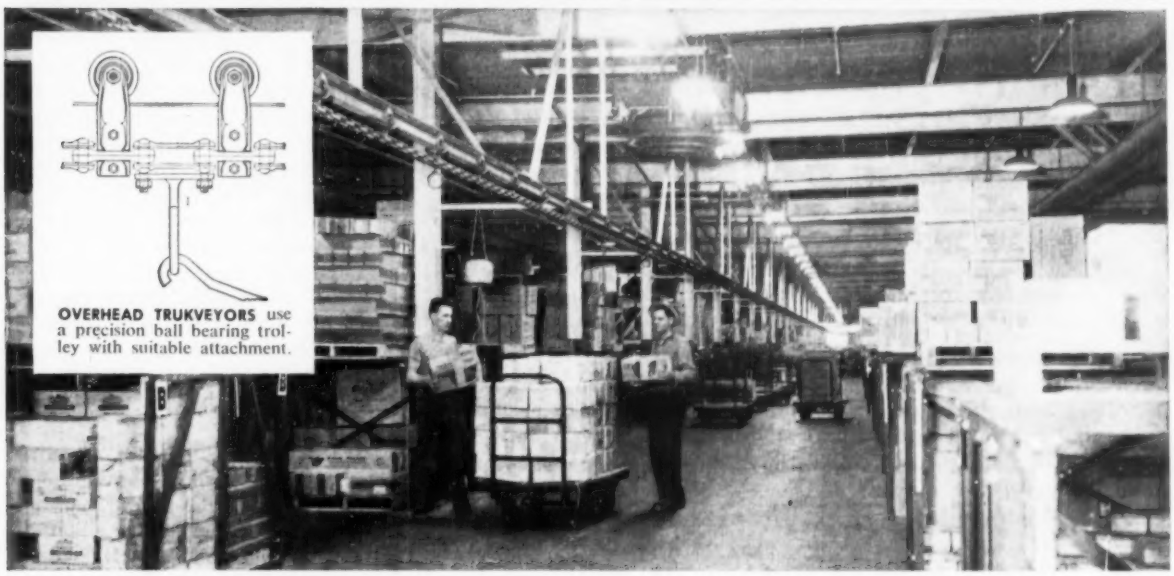

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production department in standard lots only. If a production group needs 112 square cm of plate, it has to buy an entire sheet and hold it in its own area for later use.

Material purchases for Stores are based on statistics of usage of each type of material for each type of product, and on the production schedule. Example: Compressor Type X requires an average .54 square meters of plate. Multiplying this figure times the schedule for compressor Type X determines Stores' needs.

Results: Daily adjustment system eliminated. One clerk reassigned.

III. Controlling Stores

Old Way: The stores clerk had a real paper problem. He received notice that material was coming, kept a file of "material to be received." To complicate things, his notice could have been a purchase order, requisition from another plant, or a shop order.

When material arrived, he would dig out his notice, match it with the receipt, determine disposition. Material control also kept track of stores receipts. The stores clerk was just duplicating the process.

New Way: Now the stores clerk can do his real job. He gets no paperwork until the material is in. Then he simply stores the material, digs it out, and disburses it on order from material control.

Result: The clerical function in stores is eliminated.

IV. Expediting

Old Way: Production Follow-up received copies of purchase orders, schedules, and receiving slips. The department kept an active file of purchase schedules and assumed responsibility for "expediting" the purchasing department expediters if a delivery date looked shaky.

New Way: Production Follow-up people get a short critical list 30 days prior to the shipping date for each job. That is all—they work from this. Purchasing, machining departments, and the foundry are responsible for their own follow-up.

Results: Elimination of a complete bookkeeping and filing system in the follow-up department. No more duplication of follow-up

activities. Responsibility for meeting schedules is clarified.

V. Planning Production

Old Way: The Material Control Department published parts authorizations or schedules showing the shipping date for units that were completed. All the departments in the shop interpolated from this to establish schedules.

New Way: Material Control now publishes a parts authorization schedule showing parts delivery requirements for each department. (Material Control had always figured parts delivery requirements for its own use.)

Results: Shipping shortages have been cut 75%. Inventory and production control are far better at no increase in cost. And there is no more schedule interpolating by departments in the shop.

VI. Handling Repairs

Cooper-Bessemer's customers send items to the factory for repair. Control was poor. Material was never received, or arrived without identification, or was lost.

Old Way: Customer said he would send an item for repair. Order department would fill in two seven-copy forms. Copies went to customer, material division, material control (six copies), shipping, follow-up, cost, file.

When material arrived it entered the normal shop recording procedure, including stores list, packing list, shipping tags, move tickets. Total: 77 pieces of paper.

New Way: When customer announces shipment, order department writes three-part "incoming shipment" notice. Copies go to Receiving and Cost departments (after routing through Traffic). One copy is filed.

When he receives the material, a special inspector makes up the three-part "RCM (returned customer material) Routing Form." One copy is attached to the material, stays with it through proccessing as a routing and identification tag. (Eventually, this copy is routed to the cost department for invoicing.) Another copy goes to material control division for inventory adjustment. Receiving files the third copy.

Result: Six pieces of paper do the work of 77. ●

▶ YOU AND YOUR PERSONAL AFFAIRS

With the eyes of the world focused skyward, perhaps you have been thinking of buying some star-gazing equipment. Binoculars may be satisfactory as a beginning, but you will eventually want to invest in a telescope if you get seriously interested in astronomy.

If you settle for binoculars, remember they are more comfortable for long sessions if mounted on a tripod. A 7x50 pair gives the best field and light for night work. Prices range from about $20 for some Japanese models, up to $150 for some European and U.S. makes.

There are two basic types of telescopes: the reflector (mirror) and the refractor (lens). For very detailed observations of planets and moon, the refractor type is best. However, most amateur astronomers prefer the reflector type with a paraboloid-surfaced mirror—it gives a bigger field of vision and has more light-gathering power than a comparably-priced refractor type. A 3-inch reflector costs around $30; a 3-inch refractor, around $125. A 6-inch reflector costs $250 to $300, compared to about $1,000 for the same size refractor.

Want to know more about astronomy? There are a number of good basic books. Two from the U.S.A.: Astronomy, 5th edition ($6.25, D. Van Nostrand Co., 120 Alexander St., Princeton, N. J.) and New Handbook of the Heavens ($4.95, McGraw-Hill Book Co., 330 West 42nd Street, New York 36).

●

There may be more small cars on the roads (MD, Dec, p12), but the American automobiles are more luxurious and longer than ever. And even the "low-priced" 1958 models are pushing $3,000 in price.

The big news this year: Air suspension is available as optional equipment (about $200 extra) on passenger cars for the first time (it has been limited to trucks and buses). Air suspension automatically controls the height of the car, regardless of the load, and gives a smoother ride. The French Citroen DS-19 uses hydraulics for the same purpose.

More 1958 models offer fuel injection (about $400 extra). It is supposed to give more horsepower with slightly less fuel consumption, but maintenance difficulties may offset the advantages. Not enough cars are in service for a full evaluation.

Dual headlights are here to stay. This year you will see more padded dashboards. And power accessories—brakes, steering, windows, and seats—are increasingly popular.

●

You can expect higher fares on most international airlines this year, with increases ranging from 3% to as much as 7%. But there will be no changes on polar and round-the-world flights, and there may be a new, low-cost trans-Atlantic service. Ocean liner rates should hold steady.

●

Note for wine-lovers: 1957 is likely to get a black mark on your vintage chart of French wines. The 1957 crop was one of the worst in years—low production and generally poor quality. Champagne was hit hardest of all, the worst year in three decades.

●

A look into the future: Within 20 years, your wife or maid will dust the house by waving an electrostatic wand.

Salesmen of Pfizer chemicals check an industrial map of Chicago (left) before going out on a special one-day "Operation Smokestack"—to canvass plants in the area Pfizer has never before solicited. To both the salesmen and company officials, it was . . .

A Day Well Worth the Effort

Digested from CHEMICAL WEEK, Oct19, p99

"Smokestack chasing"—literally making sales calls from factory to factory, anywhere that some sign of industrial activity is apparent—was one of the desperation selling tactics used in the depths of the 1930's depression.

The technique made a dramatic reappearance recently, as the entire 35-man sales staff of Chas. Pfizer & Co.'s bulk chemical division invaded Chicago, U. S. A., industrial areas. On a systematic basis (picture above), they canvassed companies never previously solicited by company salesmen, and many with no known use for Pfizer products.

Pfizer's "Operation Smokestack" was held as a one-day exercise during the company's annual week-long meeting of the bulk chemical division salesmen. The areas for canvassing were selected by the Chicago regional field sales manager (he spent three weeks planning the project), with the emphasis on numbers rather than quality of prospects. And, with few exceptions, each man was given an area small enough to cover on foot.

The salesmen and some regional managers entered the "smokestack" project with understandable reservations, but the experiences of the day produced a profound change in attitude.

The consensus: The day's work was well worth the effort.

Later, at division headquarters, company officials pondered the question that the project was designed to answer: Would concentrated screening yield new areas in which to sell the company's products? For its answer, the officials had these results:

About 30% of the 331 calls made during the day turned up potential near-future applications; another 40% revealed long-term prospects. Five immediate applications were discovered. And one skilled salesman actually wrote an order for several thousand pounds of one chemical for a metal-finishing plant.

"In terms of what we set out to accomplish, it was eminently successful," sums up General Manager J. P. Smith.

One obvious drawback to "smokestacking" is the expense. Pfizer wrote off much of the cost of the Chicago exercise to its annual sales meeting. Otherwise, the project would have cost the company somewhere between $5000 and $6500.

"We are not ruling out future 'smokestacks'", comments Smith, "but use of a regular basis is another matter. From the results, however, we would almost be tempted to consider all major industrial areas for future 'smokestacks'."

Besides uncovering new markets and customers, Pfizer gained several extra benefits:

—**Secondary leads.** In discussing suppliers with the "smokestacked" firms, salesmen often learned that some of the suppliers themselves might be potential customers.

—**Training.** A few sales trainees participated, and they could make mistakes without fear of serious consequences. Thus they gained valuable experience.

—**Cross fertilization.** The salesmen benefitted from working together.

It will be some time before the full benefits can be evaluated, as the experience of one salesman shows. This man had been passing a plating company on his regular rounds for years without realizing it might be a customer. As a direct result of the Chicago experiment, he called on the plating plant—and gained a customer.

About 60 different types of industries were covered in "Operation Smokestack," and only about half the industries in the Chicago area were included. The company even discovered a concentration of 20 small factories not on the latest industrial maps of Chicago.

On the average, each salesman

made nine calls; the highest was 14, the lowest six. Salesmen received assignments by drawing slips from a hat. They were furnished kits containing a map, a list of present customers and prospects (who were left out), special call report forms, price books and literature, and transportation information.

After the day's canvassing, the salesmen met in small groups to evaluate the day's results and prepare reports. To add incentive, Pfizer awarded one $100 and two smaller prizes for the best reports.

Selling chemicals is a specialized business, requiring technical knowledge as well as sales ability. Here are a few examples of what the "smokestacking" salesmen reported:

—In a forging plant, a salesman discovered that corrosion after quick-dipping was a problem, and noted that a sequestrant—from Pfizer—might solubilize the iron.

—A plastering machine manufacturer revealed that stabilization of plaster viscosity was a headache. Pfizer technical service will follow up, check out sodium citrate as the answer.

—Several tool and die producers complained of difficulties with bacteria in cutting-oil sludge and slime. Pfizer antibiotics may be able to solve their problem. ●

A "Reason Why" To Buy

It is the personality image, not the company or brand name that sells products.

Digested from PRINTERS' INK, Nov1, p41

Image-building has become an important concept in marketing; many marketing men are beginning to think of themselves as "image builders." Image-building is primarily concerned with selling goods, but there are those who say it is of fundamental importance in all company activities.

Can an image sell goods? Marketing experts say "Yes," and they explain it this way: A consumer wants a "reason why" for buying a product, and why he should choose it over competitive products. If this "reason why" can be built into a company or product image, then the customer can be led to buy instinctively, without going through a long process of logical reasoning. The image becomes the symbol of the logic.

An image can be propagated by advertising, publicity, and community activities. It can be helped along by slogans, company-created fictional persons or animals; or by a persistent theme—that XYZ Co. is "young and aggressive" or "old and dependable" or whatever.

A brand image is the personality of the brand name applied to a product. Some marketing men think this personality should remain constant through generation after generation, though advertising themes may change.

A corporate or company image says that the company is good for the customer, and that it is doing things for the customer.

To develop an image, the first thing to do is to decide what you want to accomplish. Try to find out what people think of your company now. Then try to define your problem. It may be public relations, selling more products, or building long-lasting loyalty toward the company and its products or possibly it is all three.

Work out a hypothetical image—an image that will do the job you want done. Select the qualities in your company that lend themselves to this kind of image.

Test this image. Test whether your goal can be reached better using a brand image for primary impact, with a company image secondary; or whether you would get better results by building a strong company image.

One image is usually subordinated to the other, even when both are used simultaneously. Consumer goods companies often make brand images more prominent to put more push behind their products. Industrially-oriented companies often prefer a corporate image, to emphasize service and integrity.

A company image helps win customer loyalty to the company's products, and undoubtedly helps sell products in the long run. It can be especially helpful when a company is going into new markets or marketing new products.

But a company image can be difficult to develop if the company wants to sell competing products in the same area. And some marketing men prefer a brand image because there is no danger that a "death in the family" or other

Thinking About Yearly Style Changes?

SAY "new models every year" and most people think of Paris fashions and U.S. automobiles. Both of these industries have had considerable success in convincing consumers that last year's model is not only dated, but slightly inferior.

Many marketing men have looked with envy on these industries.

Can yearly changes help other industries sell more goods? Several have been trying the idea, notably the home appliance industry (washing machines, etc.).

Now, for style-conscious marketing men, come some words of caution from U.S. appliance manufacturer Fred Maytag. Writing in *Tide*, a trade journal for marketing men, Maytag warns that while "psychological" obsolescence may have proven successful in some industries, conditions may be far different in others.

Maytag says bluntly that "artificial obsolescence" has hurt his own industry! "I'm convinced that this approach has resulted in customer uncertainty . . . and has helped create the unhealthy emphasis on price . . ."

No doubt it has created inventory and sales problems for the dealer, excess tooling costs and inventory problems for the manufacturer. And the customer "is apt to be more annoyed than pleased at the transient quality of annual appliance models."

commercial tragedy will damage the whole company image. A brand image can also maintain product sales after mergers.

Furthermore, proponents of the brand image argue that it is difficult for a consumer to form a company image—he is interested in specific products that will do him good, and is therefore likely to recognize and remember a brand image. After all, the customer can get to know a brand intimately—he eats it, or wears it, drives it, sleeps on it, and usually with pride.

To understand the problem, consider the case of the U. S. A.'s Lily-Tulip Cup Corp., maker of paper cups. This company believes in both kinds of image-building. But its marketing executives could see little value in advertising a brand image of a standard product built to well-known specifications—"an 8-ounce cup is an 8-ounce cup." So the company deferred all brand advertising until it had a product that could support a bona-fide brand image.

After 10 years of research, Lily-Tulip developed such a product—a plasticized cup for hot drinks. The next step was to select a brand name that would represent satisfaction. "China Coated" was chosen, and soon the company was able to establish a brand image that possessed—and possesses—great value. But it continues to relate the brand image to its corporate image—saying, in effect, that the product was developed by a company that is willing to dig into a problem and find out what consumers want.

Image-building has its dangers too. Remember the experience of Pinaud, the French cosmetics house? Half a century ago Pinaud was a leading brand name for women's cosmetics. Then the company marketed a man's hair dressing under the same brand image—something that many believe ruined the company's female business.

But today several intrepid concerns are trying to cross the "sex barrier" with a brand image, some with considerable success. There is a difference, however: Today's marketing men recognize the problem, and they have the advantage of expert market research. ●

U. S. IMPORTS DURING FIRST SIX MONTHS

	1957	1956	Percent Change
	(millions of dollars)		
Wearing apparel:			
wool	17.4	10.8	+61.1
silk	5.3	4.8	+10.4
synthetic	4.7	2.5	+88.0
cotton	27.8	28.1	− 1.1
Steel cutlery	7.6	6.6	+15.2
Steel tools	6.3	5.5	+14.5
Toilet goods	4.2	3.6	+16.7
Leather goods:			
footwear	9.1	7.1	+28.2
gloves	1.4	.8	+75.0
handbags and billfolds	3.2	2.6	+23.1
Photographic goods	18.5	15.3	+20.9
Toys and athletic goods	19.6	16.7	+17.4
Artworks and antiques	19.5	15.2	+28.3
Clocks and watches	32.7	30.6	+ 6.9
Musical instruments	10.1	9.7	+ 4.1
Clay and products	35.8	32.0	+11.9
Glass and products	28.0	34.0	−17.6
Canned beef	11.7	8.9	+31.5
Cheeses	12.8	12.1	+ 5.8

Data: U. S. Dept. of Commerce.

See How They Change

Digested from BUSINESS WEEK, Nov 16, p114

Total U. S. imports have been rising very slowly over the past few years. But look what has happened to the kinds of goods on department store shelves (above). There are spectacular increases.

And, barring significantly higher tariffs—scheduled for hot debate in Congress this year—or a worse-than-expected business recession, marketing men predict confidently that the volume and variety of foreign consumer goods sold in the United States will continue to expand (MD, June, p16).

American Christmas shoppers could have reached the same conclusions by walking through almost any retail outlet during the holiday buying season. On the shelves were goods from all over the world—the list would be almost endless. (As a matter of fact, there is plenty of room for more. Imported goods account for about 2% to 5% of the sales volume of American department and specialty stores; and consumer imports account for less than 10% of total U. S. imports.)

U. S. retailers like to sell imported goods—in smaller cities as well as metropolitan centers. For one reason, retailers make more money on foreign goods. "Markups" are higher, and there is less chance of direct price competition. Furthermore, retailers like to sell exclusive items—and imports act as "come-ons" to attract customers.

Many U. S. department stores are sending their own buyers overseas. More and more, they take along their own specifications. And foreign manufacturers are showing a greater willingness to manufacture to the buyers' specifications. There is a trend to the "private label"—saying the goods were made expressly for the store.

Despite more buying by specifications, merchants say that it is the colors, styling, and individuality stemming from age-old handicraft work (often now on a mass production basis) that has made the U. S. public aware of foreign goods.

To be sure, there are disadvantages for the merchant—the need for ordering too far ahead, the danger of late shipments and pilferage, the risks involved if the buyer guesses wrong, a lack of steady supply. But these disadvantages are disappearing as American buyers gain experience and more foreign suppliers see the growth of the U. S. market. ●

Keeping water out in the rain

MASONRY WALLS made of brick, stone, or concrete have long stood the test of time. But today, they can be made even better with a coating of silicone water repellents. These amazing materials prevent damaging rainwater from entering the countless tiny pores or openings in masonry structures.

WHEN THE WATER FREEZES after penetrating, it can cause spalling—cracks off small pieces. And, if it seeps all the way through to the inside of a building, paint peels . . . woodwork warps . . . plaster stains and cracks.

NOW, SILICONE WATER REPELLENTS provide the answer. Brushed or sprayed on the surface, they line—not seal—the pores in masonry. Even heavy rain driven by hurricane winds cannot break through this invisible raincoat . . . yet moisture from within can evaporate freely.

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1958 CHRYSLER CORPORATION CARS

. . . ADVANCE-DESIGN, FULL-SIZE,

COMFORTABLE, THRILLING-TO-DRIVE

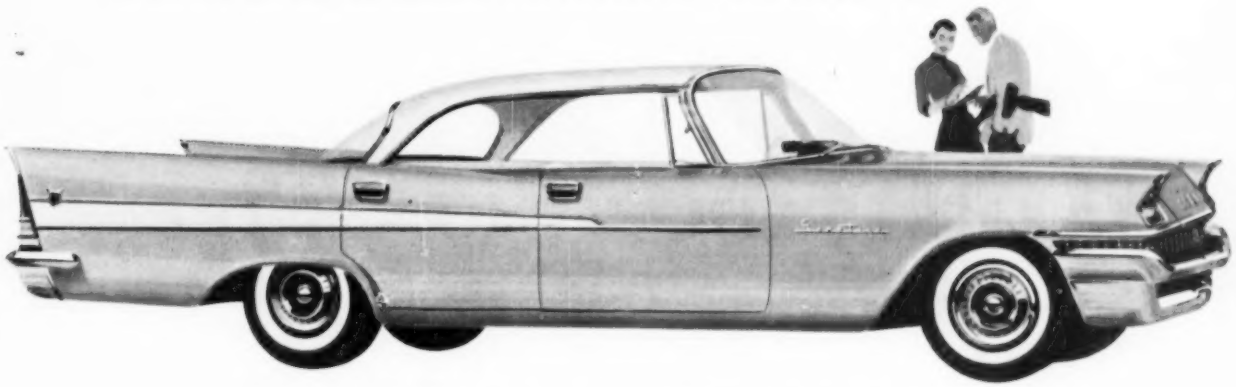
Greater room. In the clean, fluent, dart-like shape of 1958 Chrysler Corporation cars . . . with their strikingly low silhouettes, you'll find generous new armchair roominess—enough, in fact, for the entire family. Above is a 1958 PLYMOUTH BELVEDERE Two-Door Hardtop.

Controlled ride. In these 1958 *family-size* cars Torsion-Aire controls the ride—absorbing road shocks, holding the car level on turns and sudden stops. Torsion-Aire is an exclusive—and *standard*—feature of all Chrysler Corporation cars. 1958 DODGE CORONET Lancer Two-Door Hardtop—above.

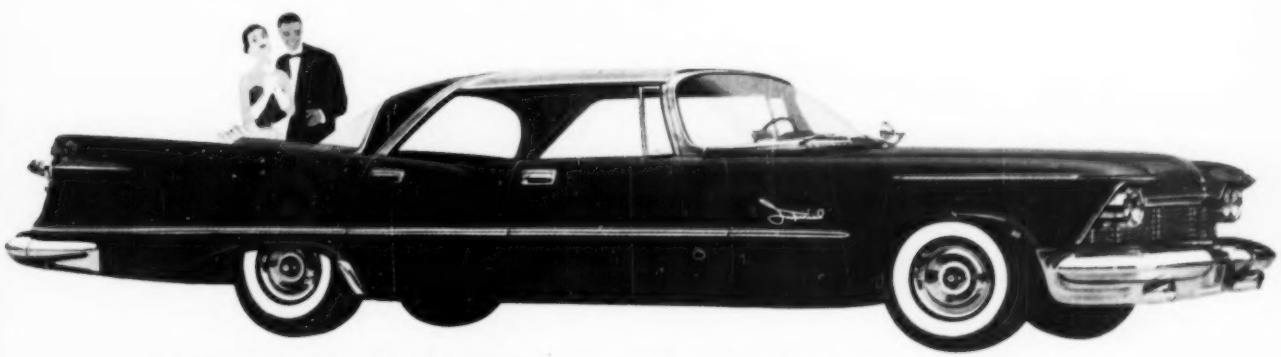
For 1958, more than ever,
THE *FORWARD* LOOK is the *ADVANCE* DESIGN **CHRYSLER**

Available at Sales and Service dealers the world over.

Smoother, quieter, more responsive engines. Chrysler Corporation cars for 1958 are powerful, but, unlike some cars, this is power *you* use at speeds you most often drive. Engines are built for top performance in all speed ranges... yet there's *no* loss in engine efficiency. Illustrated—1958 DE SOTO FIREFLITE Two-Door Sportsman.



Greater convenience. It's a fact. You free yourself from steering effort and shifting gears in a 1958 car from The *Forward* Look. New Constant-Control Power Steering works 100% of the time for you and wait until you sample pushbutton driving! Shown—1958 CHRYSLER SARATOGA Four-Door Hardtop.



Record-breaking economy. No other *full-size* car permits the economy of operation you get with Chrysler Corporation cars. During the model year just past all five cars carried away top honors in America's famed Mobilgas Economy Run. Above—the IMPERIAL CROWN 4-Door Southampton for 1958.

CORPORATION, Export Division

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ROYAL DUTCH AIRLINES

Gibberellic acid, unique plant growth stimulant, can help the world's farmers get giant fruits and vegetables — and better yields per hectare.

Tomato plant treated with the chemical in southwestern U. S. (right vine) bears handsome fruit while untreated plant succumbs to intense heat.

Plants That Reach for the Sky

BIGGER GRAPES and longer clusters, double-sized tomatoes, potatoes that sprout early, cotton with longer fibers and tobacco with broader leaves—these are only a few of the wonders expected to become a commercial reality in the future. The promise is in a chemical compound known as gibberellic acid, which has been amazing agricultural researchers by its ability to stimulate growth in a wide variety of plants.

Today one English and four American manufacturers are producing gibberellins by a penicillin-like fermentation process. Available only in test quantities, it has been put to work in agricultural laboratories in most countries of the free world. Puerto Rico is trying it in an effort to improve production of pineapples, Japan to increase leaf yield of tobacco, Italy for cotton and hemp, the U. S. A. for numerous fruits and vegetables.

The unique effects of gibberellins were first observed 30 years ago in the "crazy seedling" disease of rice in Japan. Infected seedlings grew much taller than healthy ones. The Japanese isolated the fungus causing the disease, and some years later isolated a crystalline substance from the fungus that they called gibberellin A. The more chemically pure product, gibberellic acid, came several years later out of work done by British researchers at Imperial Chemical Industries, Ltd.

What is the nature of gibberellic acid? How does it alter the life and growth of so many plants? Answers have been coming out of the continued research of British, Japanese, and American plant biologists. Its primary effect is to elongate plant cells, but it can also increase the pace at which cells divide. Scientists at the University of California at Los Angeles, U. S. A., observed a 1,000% increase in plant cells after a gibberellin treatment.

Plants treated with gibberellic acid often are two or three times larger than untreated plants. Stems and leaf stalks become longer, fresh and dry shoot weights increase, and fruit and vegetable yields are improved. Young citrus trees shoot up 600% faster than untreated seedlings.

U. S. researchers at several stations in California recently produced some startling results with grapes and other fruit. Treatment of vines with gibberellins have lengthened grape clusters and branches; this will mean less mold and rot in such tight-clustered varieties as Thompson Seedless, Tokay, and Zinfadel. The chemical also has increased the size of the grapes themselves.

With work going ahead in many countries, promising results show up in a wide variety of vegetable and field crops, trees, grasses, and ornamentals. In field trials during three years, British workers have achieved marked growth of pasture grasses by applying 5 ounces of gibberellic acid per hectare. Some varieties of grass reacted more vigorously than others, and best results were obtained when gibberellic acid was used with fertilizers.

Scientists are interested in more than growing giant plants. Other boons from gibberellins appear to be their ability to induce early flowering of plants, to speed up the germination of seeds, and to increase the number of fruit in plants.

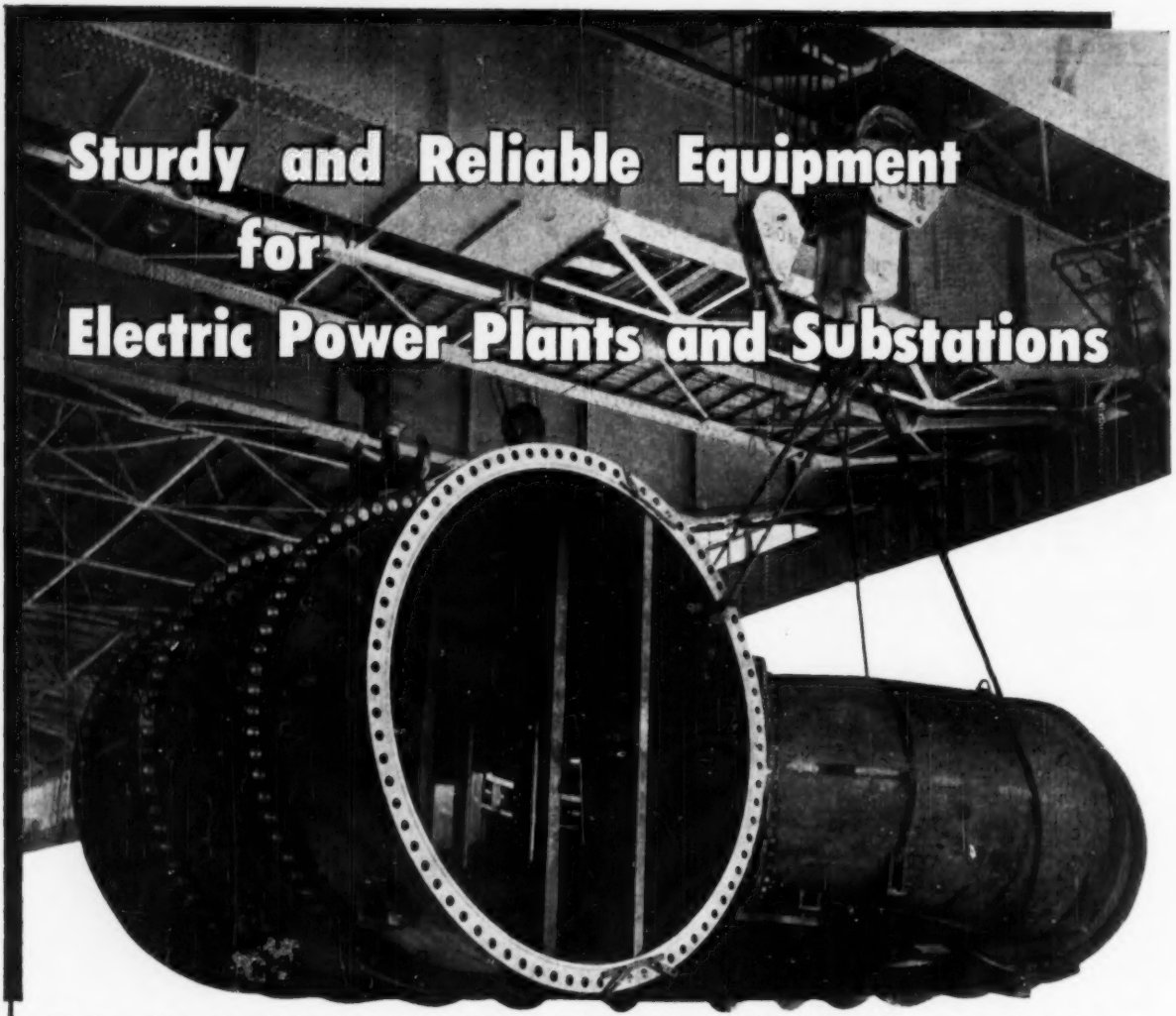
Induction of early flowering may mean that ornamentals can be made to flower without exposure to low temperatures, the quickening effect of spring. The chemical appears to replace "vernalization." The result could be more out-of-season sale of commercial flowers.

Gibberellic acid can hasten the germination of some seeds, and induce sprouting of potato seed pieces. Tests on lettuce seeds show that it substitutes for red light in stimulating germination. Freshly-harvested potato tubers sprout quickly when dipped in the chemical for five minutes.

Tomato seeds soaked in a gibberellin solution germinated in cold soil much earlier than untreated seed. Similar effects have been observed on beans and celery, and tests are going ahead on peppers, cucumbers, and melons.

A highly active chemical, effective results are obtained from gibberellic acid by using concentrations of only 1 part per million. An aqueous solution is generally

Sturdy and Reliable Equipment for Electric Power Plants and Substations



The above photo shows Casing for 150,000 HP Francis Turbine to be installed in the Bhakra Power Plant, India

HITACHI's waterwheel driven alternators are backed with more than forty years of indefatigable research and engineering experience. Several thousands of HITACHI alternators in a wide variety of capacities have already been installed with satisfactory results in power plants both at home and overseas.

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sprayed on the upper foliage of plants, though powder dustings and applications of lanolin paste also have been used. Seed treatments consist of soakings in special formulations.

Gibberellic acid is not yet being used commercially, nor have results with all plants proved successful. Experiment work continues at stations all over the world: Some yields are sensational, others qualified, some negative. But agriculturists say that the advent of gibberellic as a practical tool is imminent, and that in two or three years it will take its place with fertilizers and scientific irrigation as a key method for making the earth yield its optimum bounty. ●

Camera Studies Stress of Metals

Scientists now can watch metal crystals as they are subjected to stress and strain. At his unique metals laboratory at John Hopkins University in Baltimore, U. S. A., Professor Robert Pond has developed the world's first process for taking microscopic motion pictures of metals as they are stretched.

To study the metals in action, Pond built a special machine that can pull a 3-centimeter metal specimen with a strength of 2,800 kilograms per square centimeter. He also had to develop a technique for making motion pictures in which he could constantly keep refocusing on a moving target the size of a pinhead.

Pond's equipment allows him to watch the dislocations traveling across the surface of aluminum as it is put under increasing tension. Metal crystals outside the laboratory grow in an irregular pattern, so that where two crystal segments meet at an odd angle, there is a dislocation. Such dislocations weaken the metal. Iron, for example, theoretically should stand up under a stress of 140,000 kilograms per square centimeter; but when tested, iron breaks before the stress reaches 2,100 kilograms.

Developing metals that approach the strength of their theoretical potential is the aim of continued research in this field. ●

▶ FINANCIAL DIGEST

Towards the end of the year Russia annually trades gold for transferable sterling to clear trade obligations. This past season's Russian demand provided an added attraction for currency analysts: it helped to raise transferable sterling to its highest level in five years (page 11).

But that was not the only financial news being made by Russia and its earth-bound satellites. The ruble and other Iron Curtain currencies were showing surprising strength.

A good indication of Iron Curtain currency strength is the black market rate in bordering countries. According to the monetary analyst Franz Pick, of New York, the ruble gained from 45 to 37 per $1 between August and December. The Hungarian forint and East German mark rose too.

One reason is psychological—sputniks have added prestige to the Russian image. Some of the other causes, however, can be trade to currency control actions.

Russia's postponement of payment on domestic lottery bonds was one; East Germany's issuance of new currency was another—this action nullified large holdings of East German marks outside the country. The Communists also raised the tourist exchange rate, which has encouraged free-world residents to buy more remittances to send to relatives on the other side of the barbed-wire fences.

Still, these currencies have a long way to go before regaining their value prior to the revolutionary chaos of late 1956. The ruble, now at 37, was then selling for 19 to the dollar. The Hungarian forint, now at 63, was then 49.5; but it fell as low as 150 to the dollar after the revolution.

Trade, of course, is still carried on at official rates—and Russia's official rate is four rubles to the dollar.

●

Despite balance of payments difficulties, investment prospects look promising in Brazil. The reason: industrial equipment is pouring in at an unprecedented rate, thus increasing the country's productive capacity. Much of the equipment is going into foreign-owned plants.

But Brazilian-owned plants are not suffering. Brazil's credit control authorities approve of new obligations for the long-term financing of industrial equipment. They see this as the only way industry can remain in Brazilian hands.

Just look at the inflow of foreign capital into Brail—investments, loans, and transfers. In first half of 1957, inflow of $401-million was double the 1956 rate, six times 1955.

●

International traders using Panama's Colon Free Trade Zone now get a 90% income-tax exemption (increased from 50%) on profits made from re-exporting through the Zone (MD, July, p11). The Zone authority will also help finance construction of warehouses and facilities. Terms are 6% for up to 25 years. The Colon Zone is used by North American, European, Japanese companies as a redistribution center—they ship in bulk, reship smaller lots.

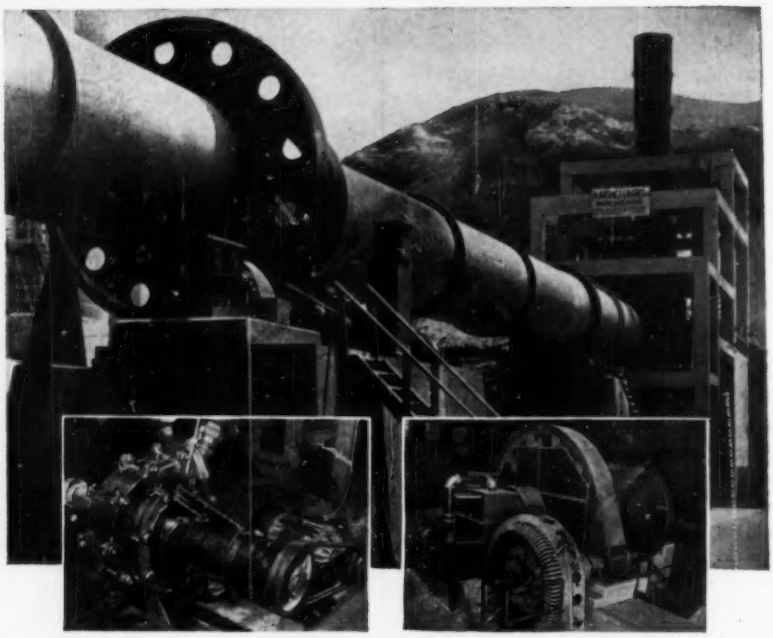
Allis-Chalmers machinery for a new cement plant goes ashore at the island of Taiwan.

ALLIS-CHALMERS MACHINERY in country after country helps produce the

World's Cement

IN Taiwan, and in other countries throughout the world, successful producers of Portland cement know and respect the machinery designed and built by Allis-Chalmers. From this one reliable source they can get crushers, grinding mills, kilns, coolers, as well as motors, control, pumps and electric power equipment. More than this, they get unexcelled engineering experience and help . . . whether it's a new plant, an expansion, or a single piece of equipment.

In this same broad manner, Allis-Chalmers serves every major industry . . . electric power, ore and mineral processing, manufacturing, city water supply. For help with machinery and production problems, call upon the Allis-Chalmers distributor in your country or write direct to: Allis-Chalmers Export Department, Industries Group, Milwaukee 1, Wisconsin, U.S.A.



KILNS. Large photo shows a 9'6" x 300' Allis-Chalmers rotary kiln installed in a cement plant in Lima, Peru. A-C kilns provide high production and economical operation.

PUMPS. This Allis-Chalmers rubber-lined pump offers up to 50 times longer life than hardest alloy steel pumps for handling abrasive fine mesh materials.

GRINDING MILL. Allis-Chalmers 10½' x 12' ball mill and 900-hp synchronous motor give high capacity and economy. Widely used in cement and ore processing.

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AUSTRALIA—Sydney.
BELGIAN CONGO—Elisabethville.
BELGIUM—Brussels.
BOLIVIA—La Paz.
BRAZIL—Rio de Janeiro, São Paulo, Recife (Pernambuco), Porto Alegre.
BRITISH BORNEO—Sandakan, Jesselton.
BURMA—Rangoon.
CANADA—Montreal, St. Thomas
CHILE—Santiago.
COLOMBIA—Barranquilla, Bogotá, Medellín, Cali.
COSTA RICA—San José.
CUBA—Havana.
DOMINICAN REPUBLIC—Ciudad Trujillo.
ECUADOR—Quito.
EL SALVADOR—San Salvador.
ENGLAND—London.
FINLAND—Helsinki.
FRANCE—Paris.
GREECE—Athens.
GUADELOUPE—Pointe-à-Pitre.
GUATEMALA—Guatemala City.
HAITI—Port-au-Prince.
HAWAII—Honolulu, Hilo.
HONG KONG—Hong Kong.
ICELAND—Reykjavik.
INDIA—Bombay, Calcutta.
IRAN—Teheran.
IRAQ—Baghdad.
ISRAEL—Tel-Aviv.
ITALY—Milan.
JAMAICA—Kingston.
JAPAN—Osaka, Tokyo.
KENYA—Nairobi.
MALAYA—Kuala Lumpur, Ipoh, Kota Bharu, Penang, Malacca, Seremban, Kuantan.
MEXICO—Guadalajara, Mexico City, Monterrey.
NETHERLANDS—Amsterdam.
NEW ZEALAND—Wellington, Auckland.
NICARAGUA—Managua.
NORWAY—Oslo.
PAKISTAN—Karachi.
PANAMA—Panamá City.
PARAGUAY—Asunción.
PERU—Lima.
PORTUGAL—Lisbon.
PUERTO RICO—Ponce, San Juan.
REPUBLIC OF INDONESIA—Djakarta, Surabaja, Medan, Palembang, Bandoeng, Semarang, Makassar.
REPUBLIC OF THE PHILIPPINES—Bacalod City, Cebú, Manila, Negros Occidental.
SARAWAK—Kuching, Sibu, Miri.
SINGAPORE—Singapore.
SOUTH AFRICA—Johannesburg.
SPAIN—Madrid.
SURINAM—Nieuw-Nickerie, Paramaribo.
SWEDEN—Stockholm.
TAIWAN—(FORMOSA)—Taipei.
TANGANYIKA—Dar es Salaam.
THAILAND—Bangkok.
TRINIDAD—Port of Spain.
TURKEY—Istanbul.
URUGUAY—Montevideo.
VENEZUELA—Caracas.

Model Kit Aids Engineers

Often it is easier to make a mechanical gadget than to design it on paper. With this in mind, a Swedish designer has put together some 5,000 pieces of components of good quality and precision, and packaged them in a construction kit called FAC. The set enables an engineer to make just about any purely mechanical device; parts include steel structural members, ratchet drive components, worm gears, ball bearings, pillow blocks, universal joints, tie rods, chain and belt drives.

Several companies are using FAC kits to build working models for sales demonstrators. A testing-lab has found the kits handy for building mechanical testing devices. The kits are sold in two sizes. The Minor Industrial kit, containing about 2,500 parts, costs the equivalent of £45, FOB, Stockholm. The Major Industrial kit, with some 5,000 parts, sells for about £85. **Transitoria Trading Co. AB, Kungsgatan 29, Stockholm C, Sweden.**

"Looking" into Closed Cylinders

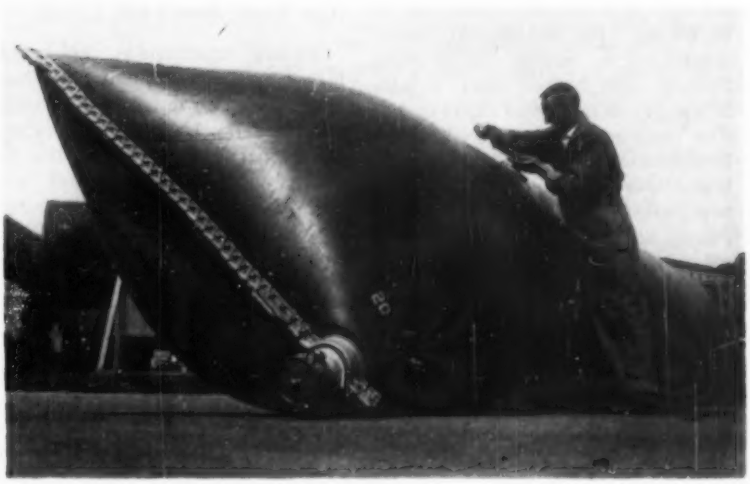
An instrument designed originally for checking the level of liquid carbon dioxide in fire extinguishers also can be used for any application where a rapid check is required on the content of closed cylinders or pipes up to 10 inches (25 centimeters) in diameter. The I. D. L. Level Detector Type No. 890, the product of joint research by The Walter Kidde Co. Ltd. and Isotopes Developments Ltd., can locate blockages involving a liquid and gas interface in pipelines, and indicate the presence of foreign material in lines.

The instrument consists of a yoke and an indicator unit, connected by a cable. One arm of the yoke carries a small radio-active source, the other holds a detector unit incorporating a Geiger-Muller tube.

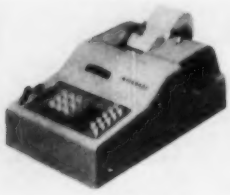
The overall length of the yoke (together with the arm to which it is attached for reaching into confined spaces) is 4 feet 2 inches (127 cm) and this complete assembly weighs only 2½ pounds (1.1 kg). The indicator unit measures approximately 10 x 10 x 10 inches (25 x 25 x 25 cm) and weighs 15½ pounds (7 kg). **Isotope Developments Ltd., Beenham Grange, Aldermaston Wharf, Nr. Reading, Berks., England.**

Flexible Tanks

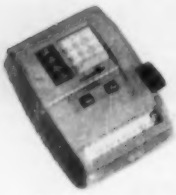
Liquid- and oil-storage headaches may soon be cured by a giant rubber-fabric container called the Sealdtank. The tank is made of four plies of rubber-coated rayon, with ends sealed by metal closures. Designed to handle liquids in transit, it can also serve as a low-cost storage vessel. When empty, the tank can be rolled up and moved by truck or elevator. A 3800-gallon container is now in production. The company's future plans call for tanks with capacities from 10,000 to 20,000 gallons. **U. S. Rubber International, 161 East 42nd St., New York, New York, U. S. A.**



Add-Mate



Multisumma



BDC Contex

Monorobot IX

New Tools for Modern Offices

LOW-COST, baby-sized calculators and computers were among the 500 products recently displayed at the National Business Show, New York. The week-long exhibition covered a wide range of supplies and equipment, from functional office furniture to the latest copying and teletyping machines. Some of the innovations are described on this and the following page.

The Add-Mate electric adding machine adds, subtracts, multiplies, repeats, corrects and totals up to 99,999,999—but weighs only seven pounds five ounces and costs $168.50. No bigger than a telephone, it can be moved about easily. The machine uses the well-known Underwood Sunstrand ten-key keyboard, and is recommended for payrolls, inventories, invoice checking, among other applications. **Underwood Corp., 1 Park Ave., New York, New York, U. S. A.**

Even tinier is the BDC Contex, described by its manufacturer as a "personal calculator" that can be slipped into a briefcase for business trips or field work. Weighing only six pounds, the machine has no protruding lever. Instead, it has an actuating bar similar to those on electric machines. The bar is depressed by the palm of the hand, without removing the fingers from the keyboards; it is said to make possible speeds that equal or exceed those of electric machines. The machine employs a ten-key keyboard and a register that permits the showing of sub-totals (to 11 digits) at every step. The price: about $125. **Bohn Duplicator Corp., 444 Fourth Ave., New York, New York, U. S. A.**

Among the wide variety of larger calculators shown in New York were two imports from Italy, the Olivetti Multisumma (about $475 in the U. S. A.) and the Divisumma ($675). The first is a speedy ten-key machine that features automatic short-cut multiplication. It combines multiplying, adding and subtracting operations without the need for re-entries. Calculations are printed on tape and identified by symbols.

The Divisumma 24 (not shown above) performs all four basic operations of arithmetic—multiplication, division, addition and subtraction—without the need for reentry of intermediate figures. The machine features fast rotary printing, an automatic constant and a "memory" unit. **Ing. C. Olivetti & CSpA, Ivrea, Italy.**

Also making its debut at the New York show was a baby all-electronic business computer, the Monorobot IX. It is another sign of a trend among manufacturers (MD, Dec, p55) to make computers practical tools for the smaller firm.

The Monorobot is completely housed in a desk, which supports an electric typewriter serving as the data-feeding mechanism. A single operator acts as typist, calculator, and checker. As the operator types an invoice or accounting statement, the machine figures simultaneously, in thousandths of a second, such computations as direct fractions, chain discounts, cross-accumulations extensions.

A flick of a switch provides printed answers as needed, while other totals are accumulated for later recall. The machine can store gross and net figures, and take discounts on either or both. Price: about $10,000. **Monroe Calculating Machine Co., Orange, New Jersey, U. S. A.**

Communications For Small Business

The new Model TDX-10 ten-line interphone system provides dial tone, automatic one-digit dialing, continuous ringing with ring-back to caller, plus guaranteed privacy. Through a built-in switchboard connection, the TDX-10 can be easily adapted to voice paging from any telephone by the addition of amplifier-speaker facilities.

The unit can be expanded to a larger 20, 40 or 74 line system at any time without disturbing existing phones or wiring. Extensions within a department or building section may also be put on any or all ten lines. **General Dynamics Corp., Stromberg-Carlson Div., 100 Carlson Road, Rochester 3, New York, U. S. A.**

Office Collators

Thomas Collators, available in

both mechanical and electric powered models, have collating capacities of 8, 10, 16, 20 and 32 sheets.

The principal new design features include an electrically-driven stroke adjustment, providing rapid finger tip adjustment of the feed arm, to handle paper from 5 to 17 inch lengths; and an adjustable bin assembly capable of collating pages from 3 x 5 inches to 20 x 17 inches. A new electric driving mechanism and improved, burred feed rollers, which assure contact with every sheet, are included. All working parts have been designed into one detachable unit. **Thomas Collators Inc., 50 Church Street, New York 7, New York, U. S. A.**

One Piece Telephone

The Ericofon makes a clean break from the traditional handpiece-desk set telephone. Standing approximately 9 inches high, it takes up less than one-half the space required by conventional phones.

The Ericofon, designed and developed by Sweden's L. M. Ericsson Telephone Co., consists of a receiver, transmitter, and dial (uniquely located on underside of base) all built into a single unit.

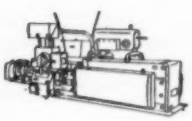
The usual line-connecting operations are made when the Ericofon is lifted, and it is disconnected when placed back on its base. It weighs less than most handpieces alone, and is available in 6 colors. **North Electric Company, 570 S. Market Street, Galion, Ohio, U. S. A.**

Where Performance Counts

WALLACE & TIERNAN EQUIPMENT IS USED

CHLORINATION

The W&T high capacity chlorinator shown above at a steam generating plant is used for chlorination of cooling water to eliminate slime formation on condenser water-side surfaces. The W&T chlorinator was chosen because of its accuracy, dependability, and simplicity of operation. These qualities are typical of Wallace & Tiernan's complete line of chlorination equipment which is widely used both in industry and in the protection of public water supplies.



PROCESS FLOW CONTROL

Equipment includes chemical solution feeders, gravimetric and volumetric dry feeders, and gravimetric meters for use in the chemical, grain, and food processing industries.

AIDS TO NAVIGATION

Includes a number of protective devices for navigation such as buoys, lamp changers, flasher mechanisms, signal timers, fog horns, aircraft flasher units and other related apparatus designed for use in the marine and air transportation field.

PRESSURE SENSITIVE INSTRUMENTS

Equipment includes a complete line of aneroid and mercurial pressure sensitive instruments, such as altimeters, barometers, and manometers designed for use in industrial testing as well as for research purposes.

Other quality Wallace & Tiernan products and services used throughout the world are listed below. For further information send for list number F-106 of available free technical publications on all Wallace & Tiernan products.

Ammonia Control Apparatus — Cathodic Protection Systems — Chemical Feeders — Chlorinators — Decay Control Process for Produce — Electric Marine Beacons — Flour Processing Chemicals — Pharmaceuticals — Precision Instruments

WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY, U.S.A.

REPRESENTED IN MOST COUNTRIES

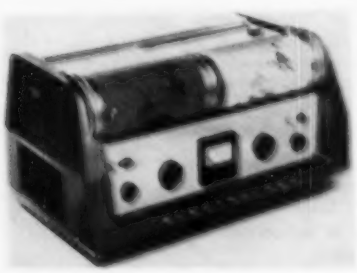
F-106

Microfilm Prints In 10 Seconds

The 3M brand microfilm reader-printer prints enlargements from microfilm files automatically in less than ten seconds. It is completely automatic, eliminating hand-processing of prints.

It projects microfilm on a viewing screen in the usual manner for reading—then makes a ready-to-use print when a button is pressed. The machine prints by an automatic electroconductive process on a special white paper, 8½ x 11 to 8 x 10½ inches.

The 3M operates on standard 110 volt alternating current. It can be placed anywhere in an office, and needs no special facilities. It measures 25 inches high x 17 x 19 inches, weighs 85 pounds. **Minnesota Mining & Manufacturing Co., International Div., 900 Fauquier Ave., St. Paul 6, Minnesota, U. S. A.**



Electronic Stencils

The Electro-Rex electronic stencil cutter places quality reproduction within the reach of any office using a mimeograph or offset duplicator. Without the help of artist or printer, the Electro-Rex will produce stencils or plates from practically any graphic material.

The process starts with an optical scanning system that picks up any images placed on the scanning side of the drum. These images are converted to high frequency currents and through electronic amplification transferred to a cutting stylus located on the reproduction side of the drum. An exact duplicate of the original is thus obtained on a plastic stencil or a plate, which can be used immediately to duplicate thousands of copies. **Zeuthen & Aagaard, 6 Esplanaden, Copenhagen K, Denmark.**

Quick-Set Printing Ink

This new ink has the unusual property of setting rapidly on paper, but will remain in the ink fountain for days without drying. Its purpose is to permit almost immediate back-up with additional copy, to allow prompt run of a second color, and folding soon afterward. All this may be accomplished with big press quality—no matter what the size of your press. **Chromatone Printing Ink Co., Inc., Div. of Polychrome Corp., 2 Ashburton Avenue, Yonkers, New York, U. S. A.**

"Flip-Flap" Machine

A new automatic machine which opens the four-flap cases used in the brewing and food industries at speeds up to 30 cases a minute has been placed on the international market. Designed to eliminate a tedious manual operation in brewing and food processing plants, the machine automatically opens (for filling or unpacking) virtually all types of four-flap can, bottle, and jar cases. **Radio Corp. of America, 30 Rockefeller Plaza, New York 20, New York, U. S. A.**

New Typewriters "Wired for Sound"

New DeJur-Triumph typewriters "wired for sound" are available in both the standard office and the electric models. A Stenorette dictating machine can be plugged into the typewriter, and all transcribing operations are controlled by two keys right on the typewriter. This control starts, stops, and backspaces the dictating machine. Complete operation of the dictating system is made part of the regular typing operation.

The Stenorette dictating machine operates on a magnetic tape principle instead of the disc or belt embossing methods. Its features include ability to make erasures and corrections electronically. The same tape can be used over and over again. **Triumph Werke Nurnberg A. G., Nurnberg, Germany.**

For very particular people . . . B.O.A.C. of course

Fly to U.S.A. or Canada on business or pleasure at reduced fares

Day in and day out, the year around, B.O.A.C. offers you the finest service in the finest, fastest airliners from London to New York, Chicago, Detroit, Boston, San Francisco and Montreal. And now there is the added attraction of B.O.A.C.'s special reductions on transatlantic fares. For example . . .

15-DAY TOURIST EXCURSIONS . . . allow you 15 complete days on the other side of the Atlantic—save you nearly £35 on the normal Tourist Class return fares.

FAMILY FARES PLAN (until 31st March) . . . big savings are possible if you travel together as a family.

B.O.A.C. operates express services to U.S.A. and Canada with superb *DC-7C* airliners (fully-reclining sleeper-seats for all de Luxe passengers). Also super-luxury *Stratocruiser* "Monarch" services London-New York direct. Other de Luxe, First Class and Tourist services to Bermuda, the Bahamas and the Caribbean.

Join B.O.A.C. transatlantic services at London. Fly direct to London from Frankfurt, Zurich or Rome by regular B.O.A.C. services, or by connecting airlines from the principal cities of Europe at 'through' fares.

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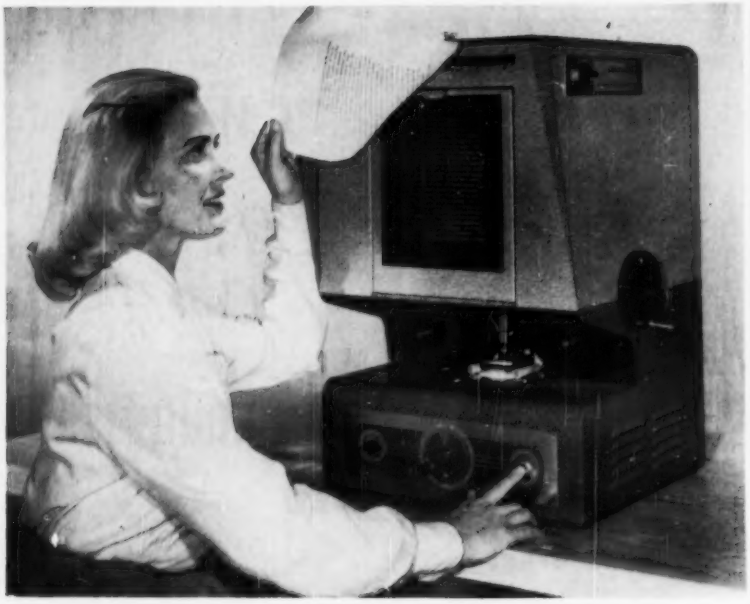
B R I T I S H O V E R S E A S A I R W A Y S C O R P O R A T I O N



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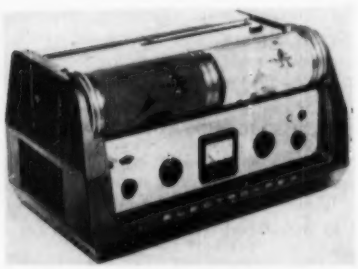

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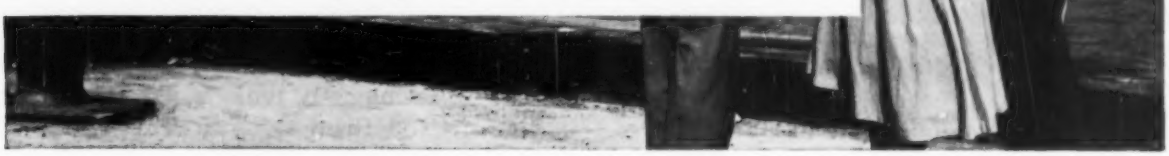

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Euclids

PROTECT PROFITS ON A WIDE RANGE OF WORK

Over 200 Euclids are working on the Illinois Toll Road, a $415,000,000 project. Here a 518 h.p. Twin-Power scraper gets a 32 yd. heaped load of heavy clay on a grading operation.

These Bottom-Dump "Eucs" can haul loads of 20 cu. yds. or more at speeds up to 34 mph.

Wherever large tonnages of earth, rock, ore and other materials must be moved . . . in mines and quarries, in heavy construction, and on industrial operations . . . Euclids get more work done at lower cost. That's why they're such an important part of the profit picture for users of heavy earthmoving equipment everywhere.

In the construction industry, for example, increased labor and material costs on one hand, and low competitive bid prices on the other, really put the squeeze on profits. Using equipment that moves more yards per shift—and at lowest cost—is the one sure way to protect the profit margin. That's why you see so many "Eucs" working on highway projects like the Illinois Toll Road . . . on dams, airports, industrial and housing sites . . . and on other jobs where heavy earthmovers are used.

Production and cost data on crawler tractors, scrapers, rear-dump and bottom-dump haulers can be obtained from Euclid dealers or write direct for the facts and figures that will prove ***Euclids are your best investment.***

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1775 Broadway, New York 19, N. Y., U.S.A.

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Newhouse, Lanarkshire, Scotland

EUCLID PRODUCTS

Heat-Resistant Butyl

A new butyl rubber will withstand sustained temperature of 400 F. and 700 F. for short periods. The material is presently being used for conveyor belts, hose, and a variety of molded products including gaskets, seals, and diaphragms. **United States Rubber Co., 1230 Avenue of Americas, New York 20, New York, U. S . A.**

Conveyor-Stacker

"Flex-Bend"—a new push-button controlled, portable conveyor-stacker—is designed for easier and faster loading and unloading of box cars and highway trucks. It has the ability to bend horizontally in either direction to carry materials around stationary objects. **Jervis B. Webb Co., 8951 Alpine Avenue, Detroit 4, Michigan, U. S. A.**

Towing Tractor

This compact and maneuverable towing tractor, designed for commercial applications, can do many jobs. Two wheel drive model features torque converter drive and automatic transmission. There is a wide variety of coupler attachments available for all models. **Frank G. Hough Co., 811 7th Avenue, Libertyville, Illinois, U. S. A.**

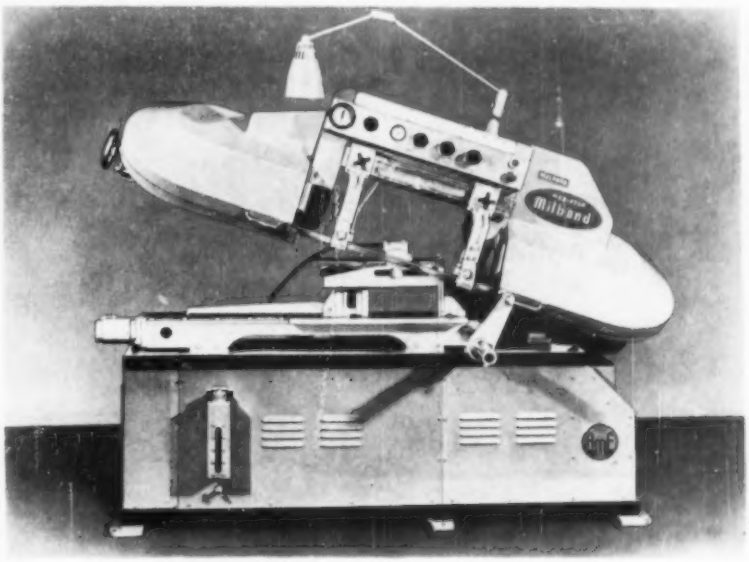
Featherweight Drill

A new air drill, weighing but 1¾ pounds and only 6½ inches long, has been developed for industrial production use. Features include exhaust noise reduction, five-blade rotor construction and offset throttle handle. Available in speeds of 2,500 and 4,000 revolutions per minute. **Thor Power Tool Co., Prudential Plaza, Chicago 1, Illinois, U. S. A.**

Traverse Type Cutting Machine

Powered by a full 20 horsepower geared-in-head induction type, continuous duty motor, the Stone T-20 is virtually unlimited in its cutting capacity. The cutting head may be operated laterally at any speed from 0 to 50 feet per minute and raised or lowered 0 to 10 feet per minute. The machine is equipped with a work stop gauge at right angles to the kerf and hydraulically controlled clamping feet for positive hold down of stock.

Wheel diameter is 20 inches by .150 inches and arbor speed is 2360 revolutions per minute with larger diameters and speeds available. Size of the Stone T-20 is 21 feet by 8 feet by 8 feet and weighs approximately 14,000 pounds. Length of cut, 12 feet; raise and lower of cutting head, 24 inches. **Stone Machinery Co. Inc., 101 Fayette St., Manlius, New York, U. S. A.**



Heavy-Feed Bandsaw Machine

The Milford Rezistor Milband machine, developed by American Machine & Foundry Co. and Thompson engineers, was designed and built specifically to utilize the full cutting capacity of HSS band saw blades. Used with Thompson's Milford Rezistor blades, it is expected by its makers to establish new standards of speed, efficiency, and economy.

Blade speeds are adjustable from 40 to 360 feet per minute. All controls are on a single panel at front of machine. A "Job Selector" chart guides operator in selecting correct tooth-per-inch and blade speed for various jobs. Hydraulic blade feed automatically compensates for increased resistance the blade meets as it cuts into heavier cross-sections.

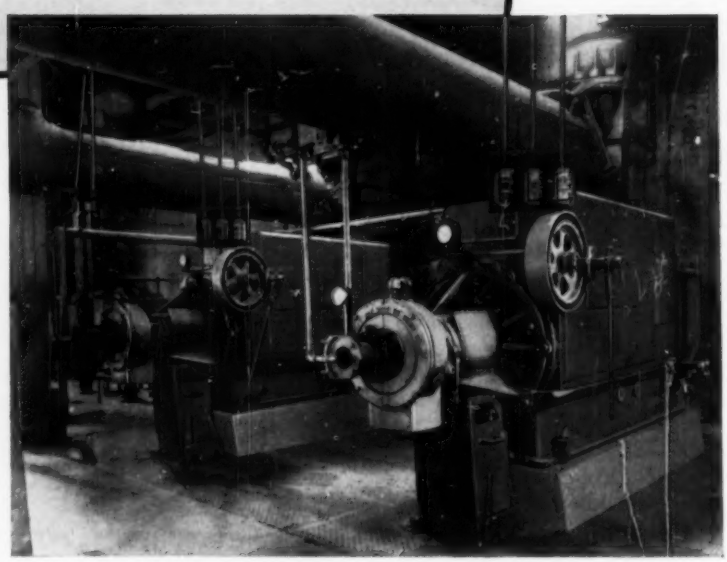
To minimize blade-flexing stresses, machine is equipped with oversized 22-inch diameter blade wheels. Efficient blade cleaning is provided by high pressure coolant stream as blade leaves cut.

The hydraulically operated stock vise has a standard capacity of 10 x 10 inches and permits adjustment for cutting angles up to 45°.

An automatic indexing bar feed is available as an optional accessory, and makes operation of the machine fully automatic. Unit, equipped with a 1-inch x 15-foot blade and powered by a 3-horsepower drip-proof motor, is 31 inches wide, 50 inches high (with head down), and 82 inches long. **Henry G. Thompson & Son Company, Chapel & Mill Streets, New Haven 5, Connecticut, U. S. A.**

THE NEW SUPER-DUO 55 EXPELLER HAS CRASHED THE 3% BARRIER AT 50 TONS PER DAY!

	cottonseed	peanuts
CAPACITY	51	50
% MOISTURE	8.03	1.20
% OIL	2.84	3.20
% AMMONIA	7.98	9.63
% PROTEIN	41.00	49.50
% NITROGEN	6.56	7.92
STANDARD	36	33



These figures show how the new Anderson 55 Expeller has "broken" the 3% barrier on cottonseed at a capacity of 50 tons/day, and obtained equally outstanding results on other materials. The versatile Super-Duo 55 is producing cake at high capacities with unbelievably low residual oils on a variety of materials. This new model of the famous Anderson High Capacity Expeller fills your need for a high production machine that obtains remarkably low residual oils. If you are modernizing or expanding, be sure to write for complete information on the Super-Duo 55. Anderson engineers in many instances can convert your present Expeller equipment to this new machine. Send for full details today.

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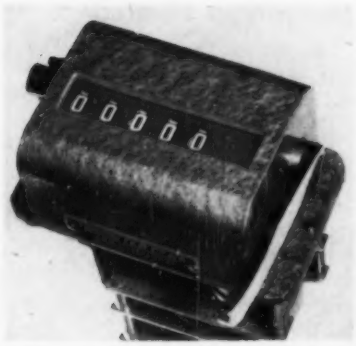


Mechanical Counter

This new Timer Unit consists of a pre-determined counter coupled to a special synchronous motor, and can be supplied to record up to 99,999 hours. It can be used to shut down machines for periodic inspection and maintenance, and will have many applications in time study control. **Trumeter Co., Ltd., Radcliffe, Lancs., England.**

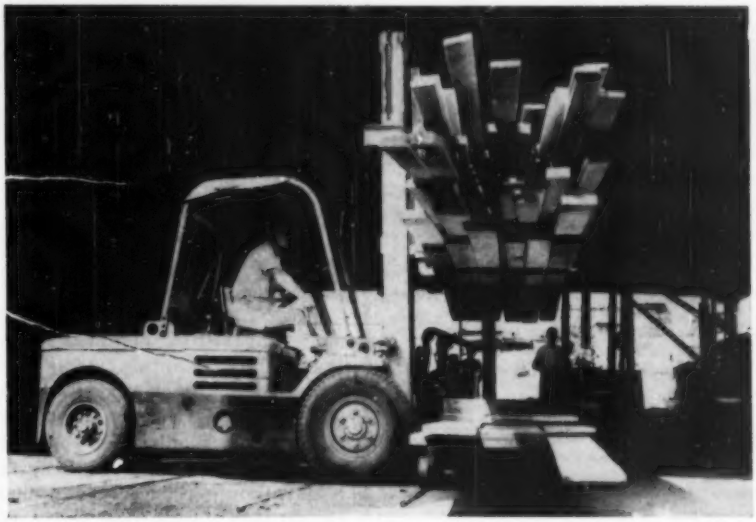
Plastic Coating Protects Paper

Business and personal papers can now be protected from moisture, smudges, and wear with the new Ply-on laminating machine.

The machine can coat one or both sides of a paper with thin, pliable sheets of transparent cellulose triacetate plastic. All you do is insert the edge of the paper in the slot, and push the starting button.

The machine weighs 30 pounds and can be operated on a desk top, using ordinary electric current. It can coat papers up to 11 inches wide, and of any length up to 1,000 feet. Cost: $275. **American Photocopy Equipment Co., 1920 W. Peterson, Chicago 26, Illinois, U. S. A.**

ONE LIFT TRUCK ELIMINATES NEED FOR 10 MILL TRUCKS, 4 DELIVERY TRUCKS



Loading and unloading time saved with one Hyster Lift Truck

ANNANDALE, N. S. W., AUSTRALIA—The excellent maneuverability of the 8,000-lb. capacity Hyster lift truck purchased by Rozelle Timber Pty., Ltd., made it possible to feed all their mill machinery and carry timber in and out of the mill with the truck. These chores previously required man-handling timbers on ten mill trucks, a slow, costly procedure.

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The van der Heem Industrial Vacuumcleaner IS 150 has been designed for use in large localities for cleaning all types of floors. Any cleaning operations can be done quickly and thoroughly thanks to its powerful suction. Working with this wheelmounted machine is an easy job.
The **IS 150** is built to last and embodies a powerful suction unit.
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MANAGEMENT DIGEST invites other consultants to list the special services they offer on these pages.

For Rough Terrain

Self-propelled Vertical-Pak pneumatic rollers provide vertical oscillation through the action of their rear wheels.

Available in a 9-ton, 9-wheel model, or 11-ton, 11-wheel model, the rollers maintain a uniform wheel load on uneven surfaces and over soft spots. Tires last longer because overloading any one tire is impossible. Ballast capacity for both rollers is 120 cubic feet. They are 13 feet 1 inch long, 84 inches wide. **Southwest Welding & Mfg. Co., Mission Road & Westminster, Alhambra, California, U. S. A.**

Powder-type Electrode

The Airco Easyarc 30, a new mild steel iron powder-type electrode, deposits metal at the rate of 17 pounds per hour (100% work factor). The speedy rate of deposition, reported to be the fastest ever approached by a "stick" electrode, is accomplished through the use of an extra heavy iron powder coating, together with increased machine settings. **Airco Co. International, 150 East 42nd Street, New York 17, New York, U. S. A.**

Plastic Core Panels

Strong panels with foamed plastic as core, aluminum and other materials as skin, offer many paneling possibilities. The aluminum and foamed plastic "planks" are available in widths to 48 inches, thicknesses to 6 inches, and are ready for fabrication into many products. **Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pennsylvania, U. S. A.**

Truck Turns in Small Space

The midget-sized dump truck shown above was designed for moving ore in low, narrow mining tunnels and adits, but it can be put to use wherever small quantities of bulk material have to be handled in cramped quarters. With an over-all length of 122 inches and a width of 60 inches, it easily turns in a radius of 96 inches while carrying loads of 2½ tons. A four-speed-forward and four-speed-reverse transmission gives the truck equal speed in either direction, further facilitating turning around. The truck has a 20-horsepower, 2-cylinder engine imported from Kloeckner-Humboldt-Deutz A. G. of Cologne, West Germany, by its manufacturer: **Getman Bros., South Haven, Michigan, U. S. A.**

Jungle Smasher Clears Virgin Lands

As the "electric tree crusher" works its way through a jungle, it leaves a 20-foot path of pulp and splinters and can clear an acre of land in 15 minutes.

The machine is 74.3 feet long, 22 feet wide, 19 feet high, and has rollers with a 9 foot diameter. When the machine moves against big trees, the front roller climbs the trunks and pushes the trees over. As the tree crashes down, the machine's teeth dig in and cut the trunk into match wood.

Basic use for the machine is in clearing jungle areas so they can be cultivated. **R. G. LeTourneau, Inc., Longview, Texas, U. S. A.**

"Walkie" Truck Handles Dies

An electrically-powered Jack-Stacker "walkie" materials-handling truck—especially designed to handle dies weighing up to 7,500 pounds—has recently been introduced.

Equipped with a hydraulic pusher and puller, it can high stack dies in storage racks, as well as transport and place them directly in press beds. With the pusher-puller attachment on the platform, dies are either pulled on or pushed off the platform by simply throwing a switch.

The JackStaker has a 42-inch long, 32-inch wide platform, a platform elevation of 54 inches, and the horizontal stroke of the pusher-puller is 42 inches. The machine will maneuver in aisles as narrow as 7 feet.

The load-carrying frame of the unit is supported by four rubber-tired rear wheels and two aluminum caster wheels. **Lewis-Shepard Products, Inc., 125 Walnut Street, Watertown 72, Massachusetts, U. S. A.**

Transistor Megaphone

An electronic megaphone weighing only 4½ pounds is completely self-contained, yet amplifies 30 times and has a calling range of 1,100 yards (1006 meters). It uses transistors and other miniaturized components. Batteries are standard type, and are located in the gun-type handle. **Den Norske Hoyttalerfabrikk A/S, Kragero, Norway.**

Hinging Pipe Insulation

The new LOF glass fiber insulation folds over piping with a "hinged action". No special tools are required for applying; an ordinary knife is used to cut and fit the insulation. The material weighs only a tenth as much as most insulations, and is said to be fire- and moisture-proof. Available in a wide range of thicknesses and pipe sizes, the insulation has good thermal efficiency from subzero to 350 F. Manufactured by LOF Glass Fibers Co., it is marketed outside the U. S. A. by: **Singer Products Co., Inc., 15 Moore St., New York, New York, U. S. A.**

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Builders Sharpen Their Pencils

BOOM YEARS have given the world a proud array of new factories, powerplants, dams and highways.

BUT BUILDING IN 1958 will have to weigh essential projects against rising costs and tight money.

Digested from ENGINEERING NEWS-RECORD, Oct 17, p 144

World construction activity has moved ahead at a brisk pace during the past 12 months. Looking ahead, construction men see countless giant projects yet to be completed—but with some roadblocks lying in the way.

Material and labor shortages have been replaced by problems of inflation, rising interest rates, tight credit. In many nations, government regulations have clamped down on some of the projects blueprinted for 1958 and 1959.

The U.S. building industry ended 1957 with its twelfth consecutive annual high, estimated at $47,000-million. But a slight downtrend was in evidence during the year, and it was expected to become more severe in 1958. One aspect of this was reflected in a recent survey of the McGraw-Hill Department of Economics, showing that U.S. private industry will spend 7% less in 1958 than it did in 1957 for new plant and equipment. An increase in home and public building may partly offset a drop in industrial building.

Meanwhile, around the world, McGraw-Hill correspondents report a huge backlog of jobs to be completed. Many are going ahead under full steam. Others may be delayed or postponed, as governments take steps to guard against inflation and protect shrinking foreign exchange reserves.

EUROPE

England's dramatic rise in its bank rate from 5% to 7% in September shook not only Britain, but the world. It reflected worldwide efforts to curb inflation, hold down public and private investments in new facilities. Reduced mortgage funds in Britain will mean less construction, which in 1957 was running about 6% above the previous year.

More large construction projects are under consideration in West Germany, though 1957 activity ran below 1956. The central bank cut its interest rate three times between August, 1956, to September, 1957, reducing the rate from 5½% to 4%. Materials and unskilled labor are in good supply. Germany now is the third largest cement producer in the world, ranking behind only the U.S. and the Soviet Union.

With one eye on the coming Brussels World's Fair, Belgium borrowed $30-million in the U.S. market last September to finance public construction. The broad program includes modernization of the country's canal system, port improvements at Antwerp, school and university buildings, Malsbroeck Airport improvements, and expansion of the nuclear station at Mol. A $10-million loan from the World Bank will help finance improvements to the Charleroi-Clabecq Canal, linking southern Belgium's coal and steel industries with Brussels and Antwerp.

Brisk building activity continues in Switzerland, where a record $1,100-million was spent in 1957 for public and private projects; 1958 may see a slight slow-down. Greece's booming public works program is aimed at modernizing the cities of Athens and Salonika.

Spain, France, Sweden, Austria, and the Netherlands all are acutely feeling the pressure of rising prices. Bank discount rates have gone up, and efforts are being made to reduce public construction. Austria is taking steps in this direction, after a 1957 program that included a $37-million roadbuilding project, $15-million for Autobahn construction, and $65-million for three housing projects.

LATIN AMERICA

The backlog of construction work to be done in Central and South America mounts with every estimate. Work continues at a swift pace wherever money or credit is available—notably, in Venezuela, Cuba, Puerto Rico and Mexico. At the other extreme are countries such as Colombia and Chile, where financial problems and lack of foreign exchange have brought construction practically to a halt.

In Mexico, building is stimulated by tourist demand for more hotels, more stores and more services. Skilled and unskilled labor is on hand, and all materials but structural and reinforcing steel are in good supply. New factories are going up as part of the country's industrialization program.

Argentina is in the midst of a giant building program, with an emphasis on office and home building. The country has negotiated with American interests for construction of a $270-million oil pipeline and refinery.

Brazil's super construction program for the next several years includes its fabulous new capital city of Brasilia, which got under way in 1957. Work on the interior city's hotel, public buildings and dam are progressing rapidly.

ASIA AND AUSTRALIA

Thailand promises to be one of the most active construction centers in Asia during the next few years. A $66-million loan from the World Bank last September will enable the country to build a 150-meter dam on the Ping River and a 140,000-kilowatt power plant.

A recently-opened cement plant in Indonesia will help this country's redevelopment program—construction materials have been in short supply.

Cement production in Australia is reaching record levels under the impetus of public and private con-

struction programs. U. S., Italian, Norwegian, and French contractors are at work on the $900-million Snowy River Project. This mammoth undertaking will entail 17 power plants, generating a total of 3-million kilowatts and providing 2-million acre-feet of irrigation water.

The success of India's Second Five Year Plan—already in trouble—depends on the country's ability to obtain at least $1,000-million in foreign credits over the next three years. Without such aid, India will have to further cut its construction program to the most essential projects.

Japan has been facing the effects of a tighter money policy. Demand for construction materials and labor have been declining under the government's efforts to curb capital investment.

Pakistan lacks most basic construction materials. Steel and cement are available only at black-market prices, though cement output has doubled during the past ten years.

AFRICA AND MID-EAST

Construction has been hampered by political troubles and war tensions—especially in Egypt. But large public projects are moving ahead in Turkey, Israel, and Central and South Africa.

Turkey has eight new cement plants and three others nearing completion. A contract with Krupp of Germany calls for doubling the capacity of the large Karabuk Iron and Steel Works.

The drop in copper prices has hurt construction plans of copper companies in Northern Rhodesia. Mufulira Copper Mines, Ltd., however, last year announced a $39.2-million program to expand its output over the next five years.

Construction of the 111-meter hydroelectric dam spanning the Kariba Gorge in Southern Rhodesia is in full swing. The $224-million project will supply electricity to the Copper-belt and to other industries and the cities in the Rhodesias.

The Union of South Africa late in 1957 obtained a $25-million loan from the World Bank to carry out a transportation development program, including railroads and other facilities. ●

"THERE'S ALUMINUM all over the place," says Amos. This includes the underlayer of the roof, expansion joints, gutters, curbs, flashing, and trim.

How Aluminum Can

THE answer to this cryptic question—the multi-prospects for the light metal—came in a visit to a new U. S. plant largely built from the metal it makes.

Men who make aluminum want to see it put to use. One way to do this is to research new applications and test them under operating conditions. That's precisely what Kaiser Aluminum & Chemical Corp. has done in building its new works in West Virginia, U. S. A.

The new Kaiser plant is a giant showcase of aluminum applications. From the decorative lighting standards and patio ceiling at the entrance to the structural work and cranes of the shipping area, everything is made of the light-weight metal. Included are the building sidewalls, office furniture and fixtures, and almost every item of the plant's main electric substation.

To demonstrate how this was done, works manager Lloyd A. Amos took the production manager of a metal products company, John Tichy, on a tour of the mill. Some of the things Tichy saw are shown on these two pages.

Amos strongly emphasized that the all-aluminum Kaiser plant was not a visionary promotion scheme. Engineers laid down a rigid rule in designing facilities for the plant. Every aluminum application had to be:

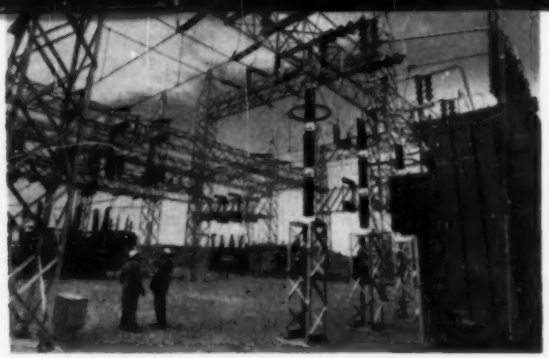
—**Practical,** in keeping with sound engineering practices.

—**Economical,** in initial and service costs.

—**Marketable elsewhere.**

Like other aluminum makers, Kaiser is not shy in pointing out the traditional advantages of aluminum. The aluminum sidewalls housing the 12-hectare mill were competitive in price with alternative materials, and they never will have to be painted They have good insulation properties, which will mean savings in heating and ventilating equipment.

But aluminum, like copper and other metals, also has its limita-



AT THE SUBSTATION, high lines, fence, columns, superstructure, bus and cables—all are made of the light metal.

IN THE OFFICE: aluminum sun louvers, window and door hardware, pitcher, desk file, safety hats, cigarette box.

WATER TANKS, each with 475,000-liter capacity, are welded high-magnesium aluminum, but set on steel legs.

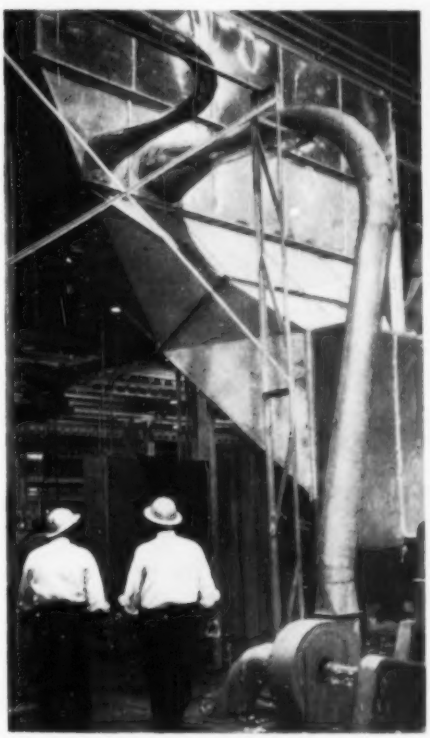
You Get?

tions and special weaknesses. Some precautions are given below.

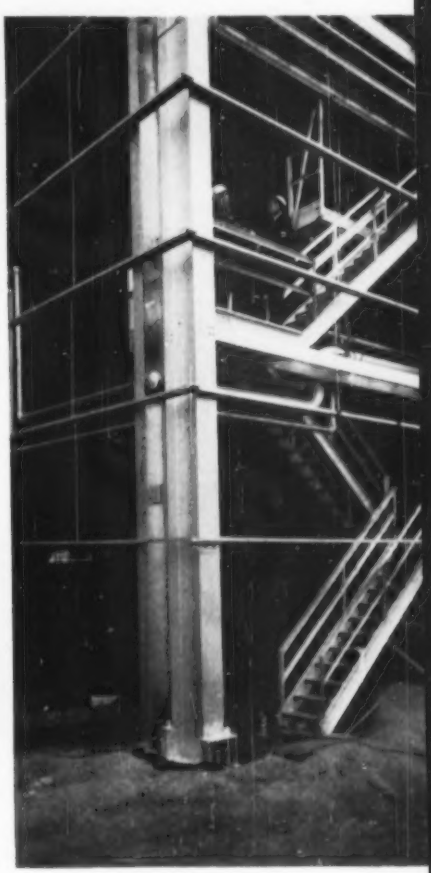
Aluminum expands. When it will be subjected to changes in temperature, allowance must be made for twice the expansion of steel. Expansion joints on ductwork and roof decking are recommended. Pipe should be supported on rollers rather than tight metal straps. Glass should not be set too rigidly in frames.

Aluminum is ductile. Though weatherproof and rustproof, the metal dents and scratches. This means added caution in hoisting aluminum parts, cinching with soft rope rather than chains.

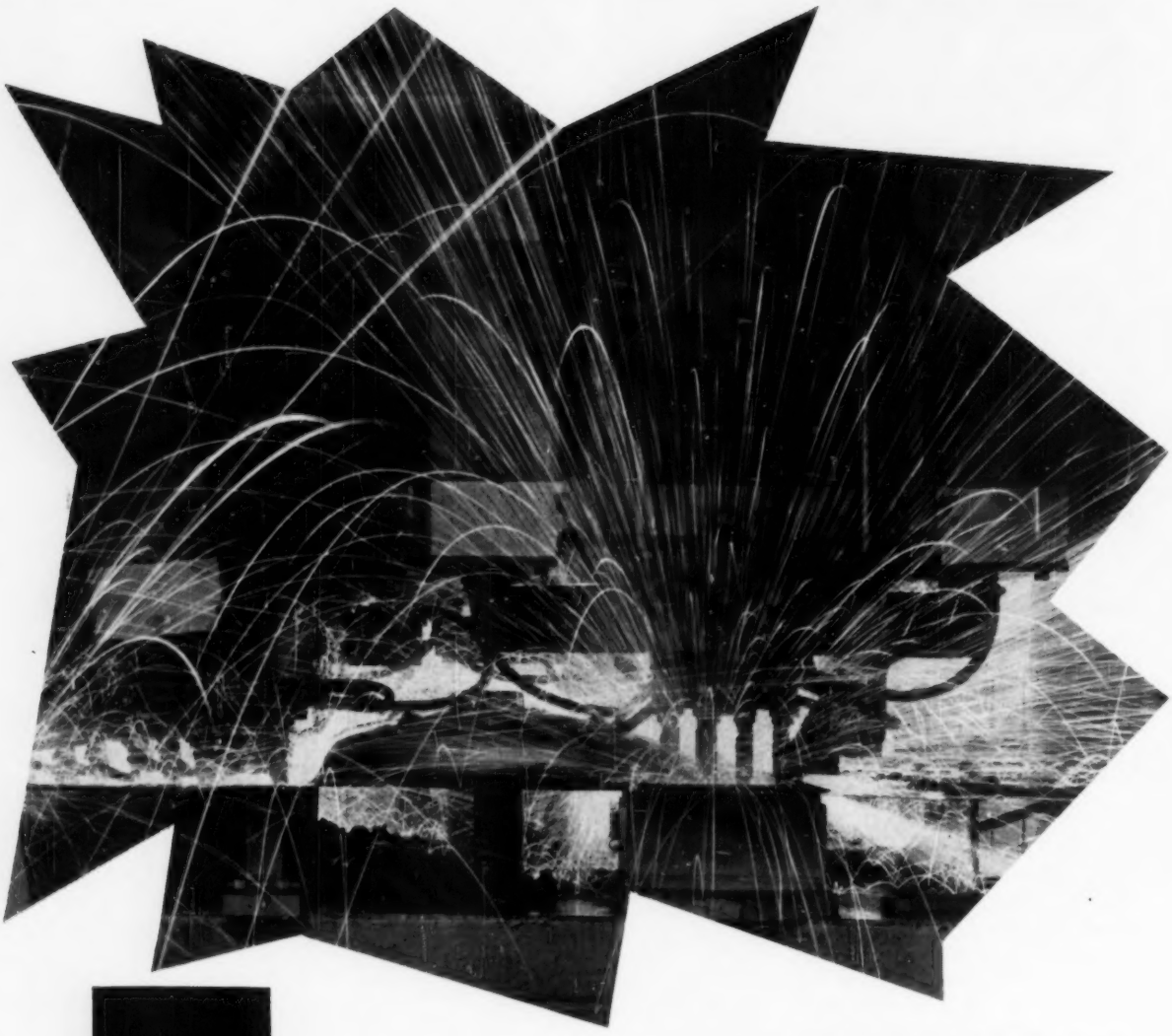
Aluminum corrodes. It reacts to moisture when in contact with base metals, concrete, plaster, and earth. Stainless steel fasteners and neoprene washers are recommended for attaching sidewalls to steel girts. Aluminum pipe and conduit should be taped or coated before burying in the ground. (*Factory Management & Maintenance, Nov, p84*) ●



AIR SYSTEM is all aluminum—ducts, fans, wiring, flashing and platforms.



STEPS and rails are aluminum. Landings are aluminum. Also, utility piping.



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Every 55 seconds, 7 hinge jaws close simultaneously with a shower of sparks.

Every 55 seconds, the frame of a new Dauphine issues from station N° 7.

At Flins, the most modern of European automobile plants, a Dauphine car every 55 seconds rolls off the assembly line

- Three-fourths of the earth's surface is covered by oceans—yet fresh water is at a premium in many areas.
- Today's projects for desalting the seas can enrich the world's deserts and supply . . .

Unlimited Water for Industry

Digested from CHEMICAL WEEK, Nov23, p55; PRODUCT ENGINEERING, Oct7, p23

ONE of mankind's fondest dreams appears close to realization—the commercial manufacture of fresh water from the world's salty and brackish seas. Proposed installations would offer an unlimited supply to serve human consumption, irrigation, and industrial needs. Laboratory techniques have been in existence for many years, but cost factors have held up large-scale developments.

Breaking the cost barrier has been the job assigned by the U. S. Department of Interior to its Office of Saline Water. In setting up the OSW five years ago, government scientists were authorized to spend $10-million in search of processes and equipment that would provide fresh water at a reasonable price—estimated by OSW to be about 40¢ per 1,000 gallons. The $2-million already spent has resulted in encouraging pilot-plant operations on three basic methods— distillation, membrane filtration, crystallization—and initial testing of a fourth, solvent extraction.

How far the overall world program has advanced came out of an 11-nation Symposium on Saline Water Conversions recently held in Washington under the sponsorship of the OSW. Methods varying greatly in cost—from 39¢ up to $1.25 and $2.00 per 1,000 gallons—were described. Scientists also were acutely aware of the dwindling supply of fresh water in many areas, the result of droughts, pollution of rivers and the lowering of underground water tables.

The spotlight at Washington focused on the announced plans of a group of gold mining companies to build an electrodialysis plant in South Africa that will make 3.6-million gallons of water a day. Salt content of Orange Free State brackish water will be lowered from 4,000 to 500 parts per million (sea water averages 35,000 ppm) at a cost of 29¢ per 1,000 gallons.

Sparking the meeting also was an announcement made two days earlier by the Maxim Silencer Co. that it had a process that can desalt water at 20¢ per 1,000 gallons, a figure well below the OSW goal and estimates of other U. S. companies. The Maxim process substitutes a steam jet for the compressor unit in some distillation designs. Arranged in multiple-effect, the steam jet unit requires no moving parts and is said to be easy to maintain.

Of the four basic methods encouraged by OSW, most work has been done on distillation. Below is given the current status of these four methods.

1. Distillation

Pilot plants for three versions of this method have been built at Harbor Island, North Carolina, U. S. A. Among the most promising is the multiple-effect unit developed by W. L. Badger and the Whiting Corp. that uses long-tube vertical distillation equipment and promises to supply water from large plants of this kind at a cost of 30-40¢ per 1,000 gallons. Just starting a six-months test is a rotary still designed by Kenneth Hickman and manufactured by Badger Mfg. Co. (no connection with W. L. Badger) that will make 25,000 gallons of water per day; OSW estimates that a large plant of this kind would furnish water at 96¢ per 1,000 gallons. Also at Harbor Island is a flash distillation pilot unit designed under OSW-contract by Griscom-Russel Co. that has a cost estimate of 20-40¢ per 1,000 gallons.

2. Membrane Filtration

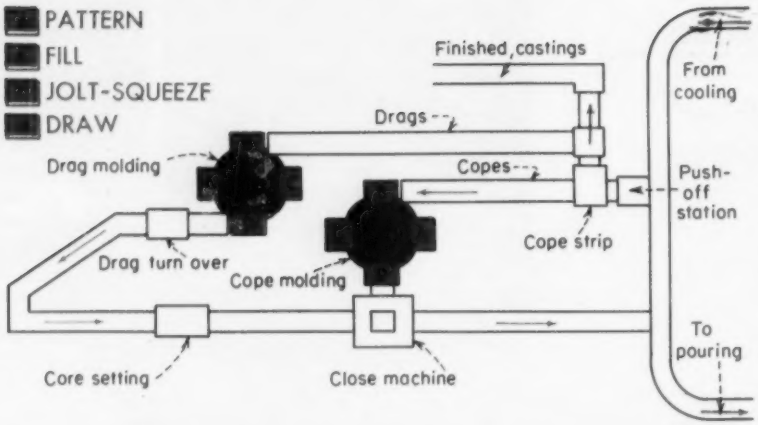
Besides the South African unit, major strides in this field are being made by Ionics, Inc. in various areas of the world. The firm's largest installation is on Bahrein Island in the Persian Gulf, where 86,400 gallons of well water daily are being reduced in salinity from 3,100 to 450 ppm. Cost per 1,000 gallon will run about 41¢.

3. Freezing and Distillation

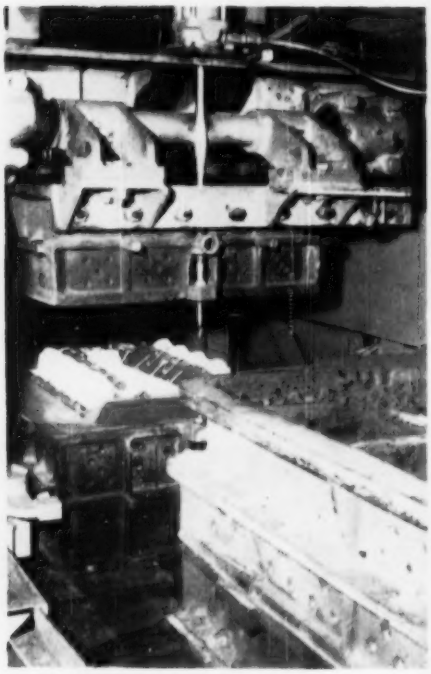
Fresh water crystallization from brine is being given extensive study by several research groups. Carrier Corp. has been testing a refrigeration process with a unit that makes about 300 gallons of water per day. Alexander Zarchin claims a cost of 10¢ per 1,000 gallons for water made by his freezing process, now being tested by the Israeli government.

4. Solvent Extraction

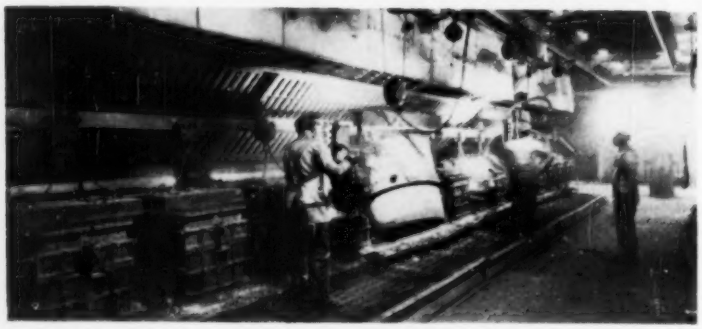
Researchers in Texas, U. S. A., have been testing various organic solvents for extracting fresh water from brine. A small experimental unit is planned. ●



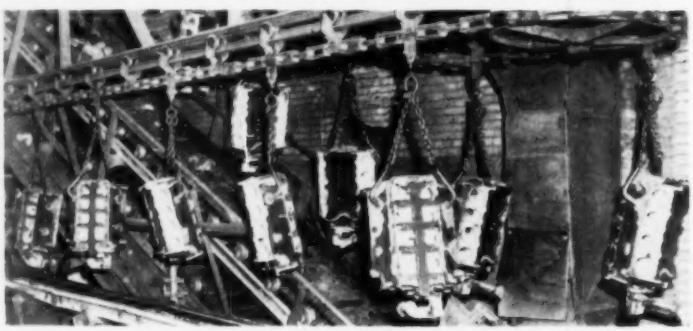
Heavy engine molds and castings move in a continuous, synchronized line from two molding machines to the pouring area and back around the cycle.



CLOSING MACHINE lowers cope over the cored drag to form the complete mold.



ONE-TON molds move by roller conveyor to the pouring area.



HOT V-8 engine blocks on their way to the cooling tower.

Now: Castings Move in Double Time

ADOPTING THEIR INSTRUMENTS and electronic controls to a foundry has been one of the most challenging jobs for automation engineers. Several fine units now are supplying various industries in the U. S. A. and elsewhere. Among them is an installation in Michigan that today is using only 20 foundry workers to turn out 150 V-8 automotive engine blocks each hour for Pontiac Motor Division, General Motors Corp.

The Pontiac unit automatically performs the complete molding cycle from the time sand enters the upper and lower (cope and drag) sections of the molding flask until metal is poured into the complete mold. All operations of the cycle are interlocked by electrical and pneumatical controls, designed by Pontiac engineers in collaboration with the Osborn Manufacturing Co. A master control panel regulates all phases of the system.

Shown in the diagram above is the flow of copes and drags in and out of the two Osborn molding machines, the heart of the system. The two machines are fundamentally the same, but with modifications in view of the difference in depth and handling of cope and drag. Each machine has four stations, and includes an indexing mechanism that passes patterns and molds from one of these stations to the next.

Starting at the drag molding station, a metal pattern is prepared and lifted into the flask. Hopper gates fill the flask with a predetermined amount of sand. The pattern and flask move to the third station for the jolt-squeeze action; then to the draw station,

where the pattern and mold are separated.

Ejected onto a conveyor, the drag mold moves to a turnover station and, after being turned through 180°, is sprayed with a quick-drying graphite solution. Next comes one of the few manual operations in the cycle, the positioning of a set of seven cores in the drag. This is done in a matter of a few seconds by a special core-setting fixture.

The drag then is conveyed to the closing station, where it moves under a cope that has been similarly processed in the other four-station molding machine. The closing unit lowers the cope onto the drag and accurately closes the completed mold, for routing to the metal pouring area.

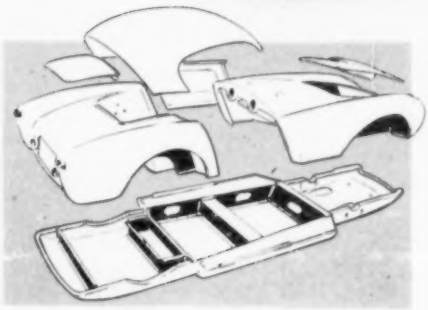
After the casting has been poured and cooled, the mold moves to the jolt shakeout area. Here the mold is broken apart, the casting hooked onto an overhead conveyor, the flasks emptied of sand, and the cope and drag sections conveyed back to their respective molding machines.

The movement of molds and flasks is continuous and perfectly timed. The handling equipment is synchronized with the molding machines in such a way that flasks enter at proper intervals and leave as they are needed for the following operation. Indexing and transfers are effected pneumatically and hydraulically in response to solenoid valves actuated by the master timer.

Even the sand supply is handled automatically. Sand from the shakeout is checked by probes, then replenished with the correct amount of water and bonding material in the muller. After mulling, it is returned by conveyor to the molding machine hoppers.

Flasks never are handled manually during the entire cycle. Workers are required only for setting the cores and for pouring, drag spraying, and hanging of blocks.

A four-man maintenance crew is available during each of the two shifts the unit operates. The crew consists of a pipefitter, electrician, millright and repairman. Another crew cleans, checks, and repairs all machinery during the shift the unit is shut down. ●



Three plastic sections—base, rear, front—fit neatly together to make the sleek soft-top shown above. Coupes need a fourth large molding for the roof. Dark areas at left are aluminum reinforcing members.

Britain's All-Plastic Car

Digested from PRODUCT ENGINEERING, Nov 11, p113

Automobile designers have had their minds set on more extensive use of plastics for some years, aware of the style potential of the synthetic as well as its light weight and cost advantages. Now the Berkeley Coachworks Ltd., England, has come up with an all-plastic car that has no structural frame in the conventional sense.

Three polyester sections—base, front, and rear—fit neatly together to make up the basic body. The only other moldings required are the doors and cover; and for the coupe, the roof.

Aluminum stiffening members have been molded into the three sections for added strength. L-shaped members run the length of the center portion and meet with members that cut across the width of the base. A four-sided aluminum box gives added support to the engine compartment, and an aluminum traverse shelf provides a base for the gas tank and auxiliaries.

Extensive use of aluminum in the wheels and engine as well as in the car body makes it even lighter than expected. One model weighs less than 280 kilograms (dry weight of complete car) and the other about 302; yet the body is a shade over 3.1 meters long and about 1.3 meters wide. The wheelbase is 1.78 meters, and the overall height, 1.1 meters.

Berkeley Coachworks is producing the all-plastic car in both coupe and soft-top models, standard or deluxe, and with a choice of either a two-cylinder or three-cylinder engine. The two-cylinder soft-top has a base price in England just under $1,000; and the coupe, a little over $1,250.

The three-cylinder engine is a brand-new Excelsior, interesting in its own right. It weighs about 45 kilograms; has a compression ratio of 7.5:1, 30 horsepower at 5500 rpm, and a displacement of 492 cubic centimeters. Bore and stroke are 5.79 and 6.2 centimeters. Cylinder barrels are of cast iron, but heads are aluminum held by studs anchored in the crankcase.

Each cylinder has its own Amal carburetor. The crankshaft, a built-up assembly, is mounted on ball and roller bearings; synthetic rubber seals between crankcase compartments help eliminate vapor loss. Lubrication is by a gas and oil mixture in the ratio of 16:1.

The Berkeley has this engine mounted traversely in the front, with exhaust ports pointing forward. For cooling, there are large fins, but no fan. The engine measures a little over 53 centimeters from cover to cover. ●

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New Road to Electricity

American scientists have just made a sweeping advance in man's search for economical energy sources. Their victory is the direct conversion of heat into electricity by a thermionic converter (photo below), developed by Dr. Volney C. Wilson and associates at General Electric Research Laboratory, U. S. A. The device converts 8% of the applied heat energy into electric power; and the researchers hope to increase this efficiency ratio to 30%.

Commercial electric power normally is made by indirect conversion of heat and motion. Heat produces steam—that spins a turbine—that drives a generator—that produces electricity. Electricity generated in this way yields up to 40% of the originally applied energy, but involves mammoth plants with mechanical equipment that is costly to maintain.

The new GE thermionic converter consists basically of two pieces of metal, enclosed in a tube-like device and separated by a gas at low pressure. The two metal electrodes are kept at high—but different—temperatures. Electrons boil off the hotter electrode and are collected by the cooler metal, which starts them through an external circuit.

An essential feature of the converter is the gas that separates the two metals. Electrons burst from the hot electrode in trillions. Without a suitable medium, the electrons would be blocked by the crowd—or, more technically, repelled by the like-charged other electrons.

Separation of the metals by a gas is one of the basic differences between the thermionic converter and thermocouples, an older method of directly converting heat into electricity. Thermocouples, often used for measuring and control instruments, produce a small electric current—at an efficiency of less than 1%—by a junction of two different kinds of metals. The GE converter permits a flow of electricity with less flow of heat. Electrodes can be at different temperatures, and the efficiency is greatly increased.

No direct conversion method to date, including the thermionic converter, provides any real competition in the big job of producing commercial quantities of electricity for industry and the home. Thermionic converters will have useful applications in special situations, and they should pave the way for continued research into economical production of electricity. As such, they take their place with other modern devices—solar batteries and photoelectric cells for converting light into electricity, fuel cells (MD, Nov, p48) for converting the chemical energy of hydrogen and oxygen into electricity. ●

Wonder Adhesive Has Debut

Holding the 2,000-kilogram car and cargo suspended in midair in the photograph above are two sections of a 5-centimeter steel rod—bonded together a half hour earlier by a single drop of liquid adhesive. The demonstration illustrates the strength and versatility of the new adhesive Eastman 910, recently announced by the USA's Eastman Chemical Products.

The adhesive contains no solvent, and requires neither heat, excessive pressure, nor a catalyst for curing. Wide applications are expected in industry and the home, though Eastman has not announced its commercial plans for the product.

Tests to date, however, indicate that 910 will form strong bonds with such diverse materials as wood, glass, cork, felt, leather, cardboard and porcelain—as well as metals, rubber, and various plastics. These materials can be bonded to themselves or to dissimilar materials.

The amount of adhesive needed for any given application depends on the type of material and its surface. Smooth, nonporous surfaces such as glass and machined metal require only one drop or less for six centimeters of bonding area; porous surfaces require more.

A weakness of the adhesive is its limited resistance to high temperatures: 165 C is the softening point for the cured adhesive. (*Chemical Week, Oct. 26, p59*)

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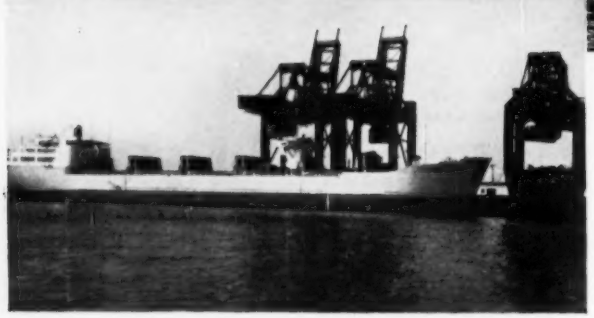
Now in operation

Ore carrier docks at C&O's new 1191-foot pier at Newport News with a 19,000-ton cargo.



The three unloaders will empty the vessel between breakfast and supper time and clean out holds without auxiliary equipment aboard ship.

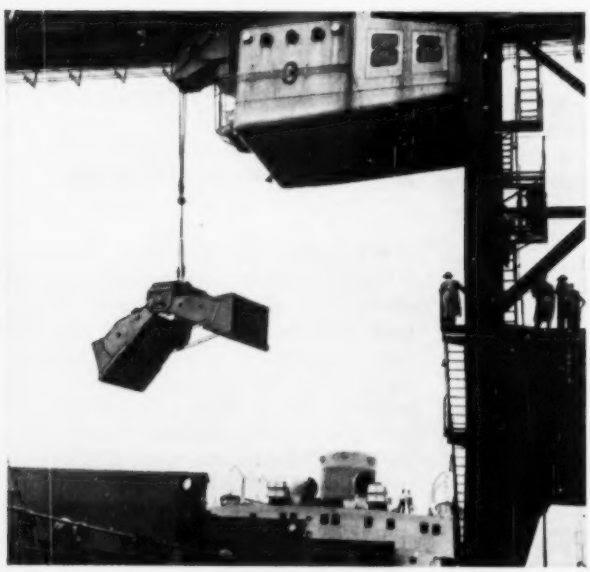
at Newport News, Va.

World's most modern ore unloading facility.

To handle an ever-increasing flow of ore imports by the steel and chemical industries, Chesapeake and Ohio has put into operation the world's most modern and efficient ore unloading facility at its great port of Newport News, Va. Incorporating the best features of American and European designs, the 8½ million dollar installation sets new standards of speed and flexibility for bulk cargo unloaders.

Moving on rails along a finger-type pier designed to accommodate the largest ore carriers afloat, the facility's three unloaders can work vessels on both sides of the pier simultaneously, or as many holds of a single ship. Several sizes of buckets, changeable in less than five minutes, are provided for different types of ore and vessel. Twin belt conveyors and car loading hoppers permit handling two types of ore at the same time without sacrifice of unloading speed. After electronic weighing, accurate to the pound, ore is loaded into thoroughly flushed out open top cars.

With an always ample car supply plus prompt delivery inland by C&O, this facility marks a new high in transportation service for ore importers. Ships now get faster turn-around as well as quick access at C&O's port of Newport News.



A giant bucket drops into the ship's hold to begin unloading at the rate of 18 tons every 45 seconds.

Ore is moved at 600 feet a minute on these conveyor belts to the carloading house.

Write for illustrated folder showing in detail the operation of C&O's new ore unloader.

Chesapeake and Ohio Railway

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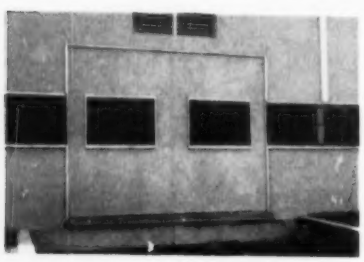
World Commerce Dept. Offices: New York 7, N. Y., 233 Broadway • Chicago 4, Ill., 327 S. LaSalle Bldg. Detroit 26, Mich., 525 Lafayette Bldg. • Richmond 10, Va., 823 East Main St. • Stockholm, Sweden, Kungsgatan 7

Looking Ahead in Technology

● **MAN-MADE DIAMONDS are stepping out of the laboratory into commercial production,** after more than 100,000 carats have been produced in pilot-plant operations. The product, according to its manufacturer, U. S. A.'s General Electric Co., is as good as or better than fragmentary bort coming from South African mines. Like bort, the synthetic material will be used exclusively for industrial operations such as grinding and polishing. A substantial quantity soon will be available for the American market, and token amounts for export. The man-made diamonds, actually a dust, are produced under terrific pressure and temperatures. Commercial production culminates three years of research and development at a cost of $2.5-million. (*Business Week, Oct.* 26, p 182)

● **FREE-PISTON GENERATORS are making big strides in France and England,** not only for electric-power generation but for locomotive and ship propulsion. One British firm, Brush Electrical Engineering Co., Ltd., is building turbines specifically tailored to these generators for ship propulsion and pumping. These generators operate at lower temperatures than compressor-type gas turbines; and, where several units feed a single turbine, one generator can be shut down without hampering the operation of others. (*Product Engineering, Oct.* 7, *p* 13)

● **EMERGENCY ACCESS to a factory or warehouse is provided by the removable wall panel pictured below,** installed as part of the new New Jersey, U. S. A. plant of the National Metal Edge Box Co. The panel was designed to simplify moving large machines in and out of the plant. Secured in position by specially designed clips, it can be nudged out in a matter of minutes by a fork truck. The panel measures about 3.6 by 3 meters, weighs 453 kilograms, and is of the same 15-cm-thick concrete construction as the exterior walls. (*Factory Management & Maintenance, Nov., p* 117)



● **A NEW RESIN that is water-soluble and resists biological attack, oil and greases appears headed** for service in such diverse fields as textiles, cosmetics, and adhesives. It is a high-molecular-weight polymer of ethylene oxide recently developed by U. S. A.'s Union Carbide Chemical Co. Trademarked Polyox, the resin features unusual thickening power at low concentrations in water. Carbide has high hopes for Polyox in warp-sizing cotton and synthetic yarns. In cosmetics, it can contribute lubricity and other desirable characteristics. (*Chemical Week, Nov.* 9, *p* 59)

● **SAFETY GLASS is converted into simulated stained glass windows** in a method developed by Monsanto Chemical Company. The process consists of bonding three layers of plastic sheeting between a sheet of painted and unpainted glass. In its first commercial application, artist John W. Hatch executed an abstract painting directly on the inside surface of glass, before it was sealed in the five-layer laminate. His work went into a 24-panel window-wall at the University of New Hampshire, U. S. A.

● **A NEW ESTROGEN HORMONE, coumestrol, has been isolated from a plant source** by researchers of the U. S. Department of Agriculture. It has about 30 times the activity of genistein, one of the most potent estrogen hormones previously reported in forage crops. Animals that feed on forage containing excess estrogens show a decrease in fertility and bear weaker offspring. Coumestrol was found in Ladino clover. (*Chemical Week, Oct.* 26, *p* 84)

● **PHOTOSENSITIVE PLATES have been developed that make it possible to go from pictures to printing press in 15 minutes.** The process, developed by E. I. du Pont de Nemours, consists of exposing a special photosensitive polymer through a high-contrast negative for about two minutes. The resultant plate (photo) is about 3 milimeters thick and may be used on rotary or flat-bed presses. DuPont says the commercial availability of this plate is a good two years away. (*Product Engineering, Nov.* 18, *p* 8)

● **MULTI-UNIT GASOLINE ENGINES which can be used interchangeably on various types of land vehicles and aircraft** by adding or dropping cylinders are being advanced by German engineers, according to an announcement by Heinrich Christiansen, president of Ilo-Werke GmbH. His firm, a subsidiary of U. S. A.'s Rockwell Manufacturing Co., has been developing air-cooled engines in which the number of cylinders can readily be changed from 4 to 6 to eight—with a maximum of 500 horsepower.

● **OIL will be made from shale** in a prototype plant to be erected by Brazil's Petrobras, following success of a pilot plant using a process worked out in the U. S. A. A commercial plant will follow, if the prototype proves the process is economical. (*Chemical Week, Nov.* 23, *p* 62)

● YOUR MANAGEMENT READING

Management Digest's editorial staff here again does the "worthwhile reading" for you to save your time. For the following literature, please write on your company letterhead directly to the address given, mentioning Management Digest.

Investing Overseas?—"Management of Direct Investments in Less Developed Countries" deals with such matters as the organization of overseas firms, the delegation of authority to overseas managers, the employment of nationals in executive positions. 238 pages, $4.34 or 16.6 guilders. (H. E. Stenfert Kroese N. V., 38 Pieterskerkhof, Leiden, Netherlands.)

More on OR—"Production Planning and Inventory Control" explains inventory control and production management—using the latest techniques of Operations Research. 346 pages, $7.50. (McGraw-Hill Book Company, 330 West 42nd Street, New York 36, New York.)

Bulletins from Industry—"Coal Bin for the World" (available in English, French, German, Italian, and Dutch) will tell you all about the American coals produced by mines served by the Chesapeake & Ohio Railway. Handling, shipping, exporting facilities are described too. (R. C. Riedinger, General Coal Traffic Manager, Chesapeake & Ohio Railway Co., Terminal Tower, Cleveland 1, Ohio.) . . . Three booklets on plastics: (1) "Plastics In Brief" is a quick guide to Allied plastics available for varied uses; (2) a 73-page handbook details the basic principles of molding and handling Plaskon urea and melamine molding compounds; (3) the applications and properties of urethane plastics are described in "Urethane Materials." (Allied Chemical International, 40 Rector Street, New York 6, New York.) . . . A new 108-page engineering manual contains information on selection and operation of Dodge V-belt drives. (Dodge Manufacturing Corp., Mishawaka, Indiana.)

Promoting New Products—"The Development of Markets for New Materials" discusses the marketing problems encountered by major producers of aluminum, fibrous glass, and plastics in introducing and building demand for their new products. $4.00 or 28/—. (Division of Research, Harvard Business School, Soldiers Field, Boston 63, Massachusetts; or Bailey Bros. & Swinfen Ltd., Hyde House, West Central Street, London W. C. 1, England.)

Essential Art—"The Techniques of Delegating" will help you in the essential art of getting things done through others. It tells how to recognize and exploit untapped abilities in subordinates. 225 pages, $3.95. (McGraw-Hill Book Company, 330 West 42nd Street, New York 36, New York.)

The Rate of Return—"More for Your Capital Dollar" will help you understand the essentials of a sound capital expenditure program. Methods for determining the rate of return are explained. 14 pages. (Amos Tuck School of Business Administration, Dartmouth College, Hanover, N. H., U. S. A.)

Understanding Labor—"Trade Unions & Democracy" is a comparative study of U. S., French, Italian, and West German trade unions: how they are different, why they behave the way they do. 92 pages, $1.75. (National Planning Association, 1606 New Hampshire Ave., N. W., Washington 9, D. C.)

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American Automobile
American Letter
American Machinist
Aviation Week
Business Education World
Business Week
Chemical Engineering
Chemical Week
Coal Age
Construction Methods & Equipment
Control Engineering
El Automovil Americano
Electrical Construction & Maintenance
Electrical Merchandising
Electrical West
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Power
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American Business
Dartnell Publications, Inc., 4660 Ravenswood Ave., Chicago 40, Ill.

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Banking
American Bankers Association, 12 E. 36th St., New York 16, N. Y.

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Ceramic Industry
Industrial Publications, Inc., 5 South Wabash Ave., Chicago 3, Ill.

The Controller
Controllers Institute of America, Inc., Two Park Ave., New York 16, N. Y.

The Economist
The Economist Newspaper, Ltd., 22 Ryder St., London, S. W. 1.

Harvard Business Review
Harvard University, Soldiers Field, Boston 63, Mass.

Heating, Piping & Air Conditioning
Keeney Publishing Co., 6 N. Michigan Ave., Chicago 2, Ill.

Industrial Marketing
Advertising Publications, Inc., 200 E. Illinois St., Chicago 11, Ill.

The Management Review, Personnel, Supervisory Management
American Management Association, 1515 Broadway, New York 36, N. Y.

Metal Progress
American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio

Modern Packaging, Modern Plastics
Breskin Publications, 575 Madison Ave., New York 22, N. Y.

The Paper Industry
Fritz Publications, Inc., 431 S. Dearborn St., Chicago 5, Ill.

Petroleum Press Service
Petroleum Press Service 91 & 93 Bishopsgate, London, E. C. 2

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Temple Press, Ltd., Bowling Green Lane, London, E. C. 1

Printers' Ink
Printers' Ink Publishing Co., Inc., 205 E. 42nd St., New York 17, N. Y.

The Rubber and Plastic Age
Rubber and Technical Press, Ltd., Gaywood House, Great Peter St., London, S. W. 1

Sales Management
Bill Brothers Publishing Corp., 386 Fourth Ave., New York 16, N. Y.

The Times Review of Industry
The Times Publishing Co., Ltd., Printing House Square, London, E. C. 4

Welding Engineer
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